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THE FIRST BOOK OF Architecture:

BY

ANDREA PALLADIO.

Tranſlated out of *ITALIAN*,
With an **APPENDIX** touching
DOORS and WINDOWS,
By P^R. *Le MUET*, Architect to the *French* King.

Tranſlated into *Engliſh*, by GODFREY RICHARDS.

The Whole illuſtrated with above Seventy Copper Cuts.

ALSO

Rules and *Demonſtrations*, with ſeveral Deſigns, for the Framing of any manner of *Roofs*, either Above *Pitch*, or Under *Pitch*, whether *Square* or *Bevel*; never before Publiſhed: By that Ingenious Architect, Mr. WILLIAM POPE of *London.*

WITH

Deſigns of *Floors* of Variety of Small Pieces of Wood Inlaid, lately made in the Palace of *Somerſet-Houſe*; a Curioſity never practiſed before in *England.*

The Twelfth Edition, *Corrected* and *Enlarged*: With a *New Model* of the *Cathedral* of St. *Paul, London*, as it is now Rebuilt.

LONDON,
Printed for *A. Betteſworth* and *C. Hitch*, and *J. Osborn* in
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BRITISH MUSEUM
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The *PREFACE* to the READER.

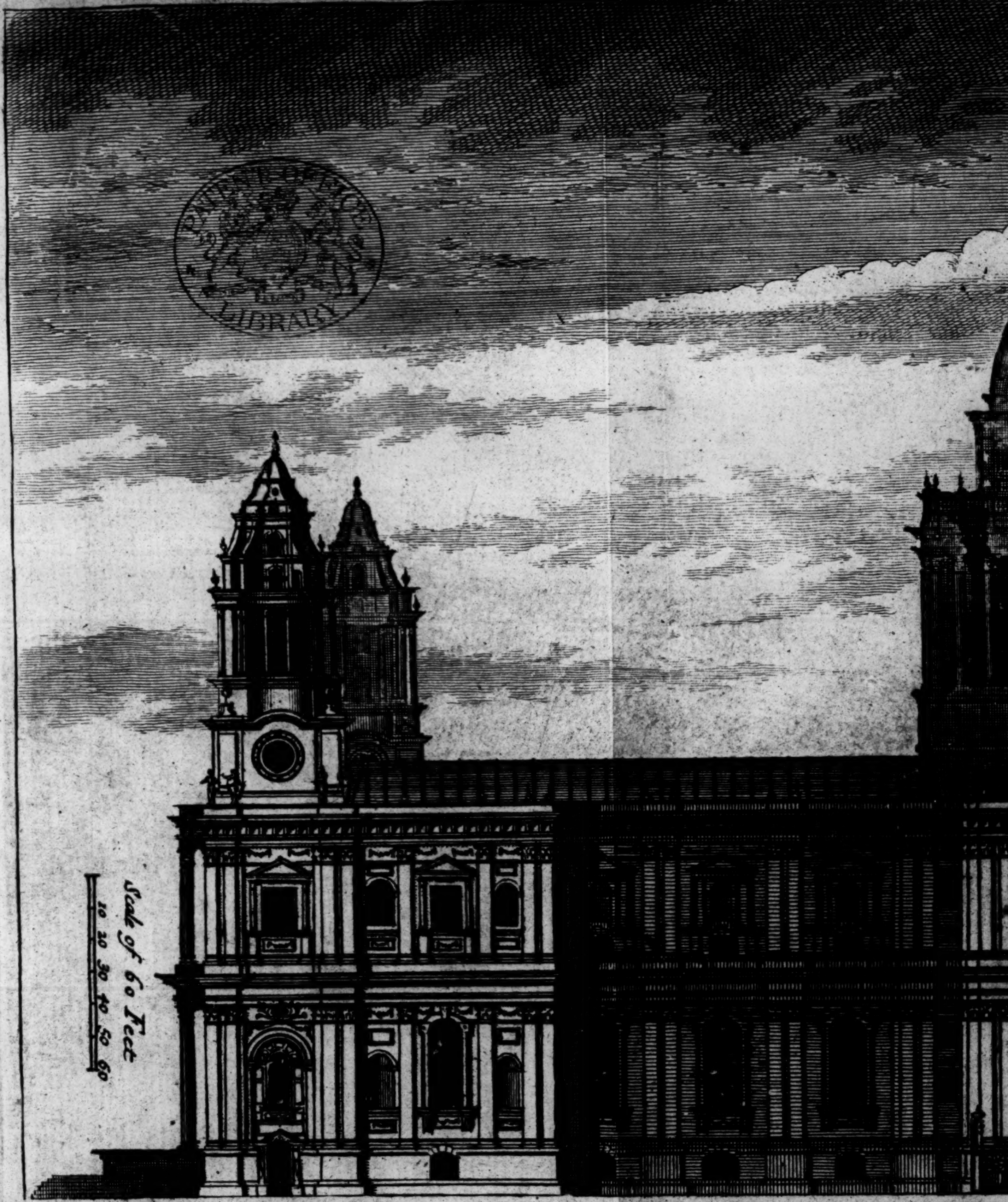
THE *Subject of this Tranſlation being* ARCHITECTURE, *doth in the Opinion of Sir* Henry Wotton, *need no Commendation, where there are noble Men or noble Minds: Therefore I ſhall only give you an Account of the Author's, and my own Concernments herein: He was* Andrea Palladio, *a Famous Architect of* Italy; *where taking notice of the Irregularities and Deformities in Buildings introduced by Invaſions of the* Goths, *and other* Barbarians; *to prevent thoſe Inconveniencies for the future, he thought fit to inſtruct the World in the Rules and Practices of the Learned Antients, having Opportunity to obſerve the Footſteps of their Labours, even at* Rome *itſelf, where being the greateſt Concourſe of noble Men and noble Minds, they ſpared neither Care nor Coſt in* Building: *And in imitation of them, our Author is exact in his Directions touching every Material, as in the Choice of* Stone, Timber, Metals, Sand, Lime, Brick, *&c. what good, and what not, how to be prepared and put in uſe. 'Tis obſerved, how careful they were in making their* Brick *and* Lime, *not forbearing the hardeſt* Stone: *for, as Sir* Hen. Wotton *obſerveth, that the* Italians *to this Day, and much more the Antients, did burn the firmeſt* Stone, *and even* Marble *itſelf, where it was plentiful, which in time became* Marble *again, or at leaſt of indiſſoluble Durity, as appeareth in the ſtanding Theatres. And other Learned Men have required that all the* Timber *be cut out of the ſame Foreſt, all the* Stone *out of the ſame Quarry, and the* Lime *be made out of the ſame Stone of which the Building is intended, imagining that they will ſympathize and joyn better, by a kind of original Kindred. But inſtead of this Curioſity, we too often make* Lime *without any great choice, and of refuſe Stuff; which is an* Engliſh *Error of no ſmall moment in our* Buildings. *After theſe Particulars, our Author proceeds to treat of the Five Orders of* Columns, *whoſe Members and Proportions, as he hath laid them down, are, by the Judicious, eſteemed the moſt excellent in their kind; and for ſome of their Terms, which I have changed, it was not without the Advice of ſkilful Artiſts, thereby to conform to thoſe Terms moſt familiar to our Workmen.*

To theſe are added Deſigns of Doors *and* Windows, *by* Pr. Le Muet *Architect to the* French *King, which I thought good to preſent* (Palladio *only diſcourſing of them) they being well approv'd by all Artiſts,* *both for the Manner and Proportions, and the ſame which are at the* Louvre *at* Paris; *and out of him, I have given the Proportion of* Halls *and* Chambers, *tho' a little differing from* Palladio, *becauſe moſt agreeing to the preſent Practice both in* England *and* France. *And for the ſame reaſon I do, inſtead of Monſ.* Muet's *Deſigns of* Frames *of* Houſes, *put in ſuch as are us'd in* England, *by the direction of ſome of our ableſt* Architects; *which (I hope) will be grateful, and very uſeful, not only to our Artiſts, but Gentlemen and others which may have occaſion to build; giving an account of all the Names proper to each Member and Principal of the Houſe; and alſo ſhew the Manner of Framing, with their ſeveral* Scantlings *and* Butments.

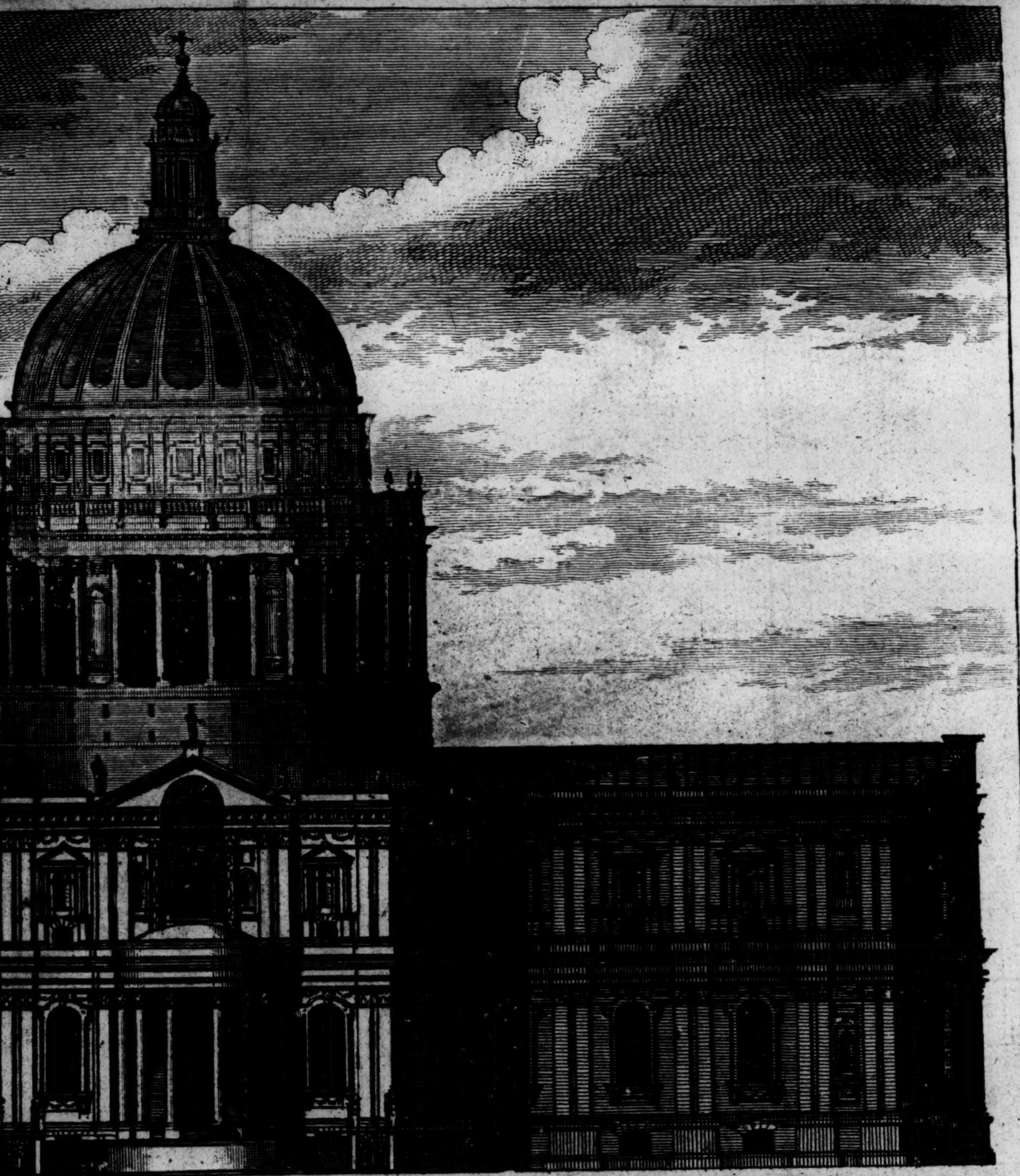
Altho' we want not ſuch ingenious Artiſts, *whoſe Names deſerve to be celebrated for many ſtanding Examples of their Skill, which do better deſerve Deſcription, than many publiſhed with much Pomp, beyond the Seas; yet we have but few Books which we can recommend to you, beſides the Excellent Diſcourſes of Sir* H. Wotton, *and* John Evelin, *Eſq; the former on the Elements of Architecture; and the latter, in his Account of Architecture and Architects, added to his elegant Tranſlation of the* Parallel) *where they have compriſed fully and clearly the moſt weighty Obſervations of the Art in general: The Studious will need only to ſerve himſelf of the particular Parts thereof, according to his own Occaſions.*

And ſuch Pieces as are here preſented, the Reader *cannot think unſeaſonable, being againſt the Rebuilding of ſo great a City as* London, *wherein the King having ſhewn his particular Care of keeping the Trade in its former Channel, by fixing the* Exchange, Cuſtom-Houſe, *&c. on their Old Foundations; and their Laws having provided for ſuch a Way of Building as may joyn together (what our Author requires to be obſerved by every Undertaker)* Accommodation, Handſomneſs, *and* Laſtingneſs, *and prevent that Deformity and Danger which we have formerly been liable to, by Irregular and Slight Buildings, Narrow Streets, Intolerable Encroachments, Jetting Windows, and what not, that might make it Combuſtible. I hope both Old and Young do rejoyce at the Rebuilding of* London, *a Second happy Reſtoration, inferior only to that of his Majeſty's Perſon and Government.*

Godfrey Richards.



The South Prospect of ST.



T PAUL'S *Cathedral London.*

The Firſt Book of ARCHITECTURE:

By *ANDREA PALLADIO.*

CHAP. I.

What ought to be Conſidered and Prepared, before you begin to Build.

BEFORE you begin to Build, you ought carefully to conſider every Part of the Foundation and Ground-work of the Building which is to be Raiſed. Three Things in a Building (as ſaith *Vitruvius*) ought to be conſider'd, without which it will not deſerve Commendation: Thoſe are, Uſefulneſs or Accommodation, Laſtingneſs and Handſomneſs: For that Work cannot be accounted Perfect, which is Uſeful but only for a ſhort time, or not Convenient for a longer; or having theſe two, hath not alſo Decency: It will be Commodious, when every Part hath its due Place, and fit Situation, not below its Dignity, nor above what its Uſe requires; and they will be fitly diſpoſed, when the Galleries, Halls, Chambers, Cellars, Granaries are in their proper Places. As for the Laſtingneſs, you regard that, when all the Walls are right by the Line, thicker below than above, and have good and ſufficient Foundations:

And beſides, the Pillars above muſt be directly over the Pillars below; and all the Apertures (as Doors and Windows) muſt be one above the other, ſo that the Solid be upon the Solid, and the Vacant upon the Vacant. The Handſomneſs will ariſe from the fair Form and Correſpondence between the Whole and its Parts, of the Parts among themſelves, and of them to the Whole; becauſe that a Building ought to appear an entire and perfect Body, wherein each Member agrees with the others, and all the Members be neceſſary to what you deſign.

Theſe Things conſider'd in the Deſign and Model, you ought then diligently to calculate all the Charge that may ariſe, and make timely Proviſion of Money, and prepare what Materials ſhall ſeem requiſite; ſo that in Building, nothing may be deficient, or hinder the Compleating of the Work: It being no little Praiſe to the Builder, nor ſmall Advantage to the Work, that it be finiſhed with due Expedition, and that all the Walls be at once laid out, and equally diſpatched; from whence there will be none of thoſe Clefts which uſually are ſeen in Fabricks finiſh'd unequally, and at divers times.

And therefore having choſen the moſt skilful Artiſts that you can get, that ſo the Work may be the better carried on by their Advice, you are to provide Timber, Stone, Sand, Lime, and Metal, concerning which Proviſion, you ſhall have ſome Advertiſements; as, to frame the Joiſts of the Hall and Chambers, provide your ſelf with ſo many Joiſts, as, when framed, there may remain between them the Space of a Joiſt and half.

In like manner concerning Stone, you are to take notice, that to make the Jaums of Doors and Windows, you are not to have Stone bigger than a Fifth, or leſs than a Sixth part of the Light; and if you intend to adorn the Buildings with Pillars or Pilaſters, make the Baſes, Capitols, and Architraves of Stone, and the other Parts of Brick.

Beſides, as for the Walls, you are to conſider, that they ought to diminiſh according as they riſe; which Inſtruction will ſtate the Account right, and leſſen great part of the Charge: And becauſe all theſe Parts may be diſcourſed of in their particular Places, it ſhall ſuffice to have here given this general Advice, which is a rough Draught of the whole Building.

But beſides the Quantity, you are alſo to conſider the Quality and Goodneſs of the Materials, to chuſe the beſt: Experience gained from the Buildings of others, will be a great Help, becauſe thereby we may eaſily know how to determine what is fit and expedient to our own Purpoſe. And although *Vitruvius*, *Leon Battiſta*, *Alberti*, and other excellent Writers, have taught what is requiſite in the Choice of Materials; yet that nothing may be wanting in theſe Books of mine, I ſhall ſpeak of ſome, confining my ſelf to the moſt neceſſary.

CHAP. II.

Of Timber.

Timber (*Vitruvius* hath it, *Book* II. *chap.* 9.) ought to be Fell'd in *Autumn*, and through all the *Winter*, becauſe then the Trees recover from the Root that Strength and Soundneſs which in the *Spring* and *Summer* was diſperſed into Leaves and Fruit; and you are to cut them in the Wain of the Moon, becauſe the Moiſture which is moſt apt to rot Wood, is then conſumed; from whence there will not come the Worm to hurt it. It ſhould be cut but to the middle of the Pith, and ſo left until it be dry; becauſe by Drops, there will paſs away that Moiſture which would cauſe Putrefaction: Being cut, let it be laid in a Place free from the Extremity of the Sun, Wind, and Rain; and thoſe ought chiefly to be kept dry which are of ſpontateous growth; and to the end that they may not cleave, but dry equally, you are to daub them over with Cow-dung: It ſhould not be drawn through the Dew, but in the Afternoon; nor to be wrought being very wet, or too dry; becauſe the one makes it apt to rot, the other hard to work; nor will it in leſs than Three Years by dry enough to uſe in Planks, Doors, and Windows. It is convenient for thoſe who are about to Build, to inform themſelves from Men skilful in the Nature of Timber, what Wood is fit for ſuch Uſe, and what not. *Vitruvius*, in the Chapter above mention'd, gives good Inſtructions; and ſo other Learned Men, who have written thereof at large.

CHAP. III.

Of Stone.

SOme are *Natural*, ſome *Artificial*: The *Natural* are hewn out of the Quarry, and are either to make Lime, or to build Walls: Of thoſe which are uſed for Lime, ſhall be ſpoken hereafter. Thoſe of which Walls are built, are either Marble and hard Stone, or elſe ſoft and pliant. Marble and hard Stone is to be wrought as ſoon as digg'd; for it will be at that time more eaſy to work, than when it hath remain'd a while in the Air; ſeeing the longer they are out of the Quarry, they become the harder, and muſt ſuddenly be put in hand. But the ſofter the Stone, (eſpecially where its Nature and Sufficiency is not well underſtood, as when 'tis digg'd in a Place from whence formerly none has been taken) it ought to be digged in *Summer*, and expoſed to the Air, and not to be uſed within two Years: It muſt be digg'd in *Summer*, to the end that not being uſed to Wind, Rain, and Froſt, it may by degrees grow hard, and enabled to reſiſt thoſe Injuries of the Weather; and it ſhould be left ſo long, that thoſe which have been prejudiced may be put in Foundations; and the others not ſpoiled (upon trial) are to be uſed above Ground in Buildings, becauſe they endure longeſt.

Artificial Stones, are, from their Form, commonly call'd *Quadrels*; theſe are made of Chalky, Whitiſh, and Pliable Earth: You muſt by all means avoid that which is Gravelly and Sandy; the Earth muſt be digg'd in *Autumn*, and temper'd in *Winter*, and ſo they may be well made in the *Spring*: But if Neceſſity forces you to make them in the *Winter*, or *Summer*, cover them in *Winter* with dry Sand, and in *Summer* with Straw:

When made, they require a longer Time to dry; and 'tis beſt that they dry in the Shade, ſo that not only the Outſide, but the Middle, and all Parts may be equally hardened; which cannot be done in leſs than two Years. They are made bigger, or leſs, according to the Quality of the Building, and the Uſe to which they are intended; therefore the Antients made their Bricks for Publick and great Buildings larger than for ſmall and Private: The Bigger ſort ought to be hollowed in many Places, that ſo they may dry and bake the better.

CHAP. IV.

Of Sand.

THere are three ſorts of Sand, that is to ſay, Pit-Sand, River-Sand, and Sea-Sand. Pit-Sand is, of all, the beſt, and is Black, White, Red, or Cindry, which is a ſort of Earth burnt by Fire, incloſed in the Mountains, and digged up in *Tuſcany*. There is alſo digged in *Terra di Lavoro*, in the Territories of *Baio* and *Cuma*, a Sand called (by *Vitruvius*) *Pozzolana*, which ſuddenly knits together in Water, and makes Buildings very ſtrong: It hath been found, by long Experience, that of all Pit-Sand, the White is the worſe; and of River-Sand, that from the Stream which is found in the Falls of Water, is the beſt, becauſe it is more purged. The Sea-Sand is worſt of all, and blackens and ſhines like Glaſs; but that better which is neareſt the Shore, and bigger. The Pit-Sand, becauſe 'tis fat and tough, (but apt to cleave) is therefore uſ'd in Walls and long Vaults. The River-Sand is very good for the Covering or Rough-caſting of Walls. Sea-Sand, becauſe 'tis ſoon wet and ſoon dry, and moulders away by reaſon of the *Salt*, therefore is unfit to bear Weight. All Sand is beſt in its Kind, if being ſqueezed and handled, it crackles, and if being put upon a White Cloth, it neither ſtains, nor leaves it foul: That is bad, which is mingled with

Water, makes it dirty and muddy, and which has for a long time been in the Air, Sun, Moon, and Froſt; becauſe it will retain much Earth and rotten Humour, apt to bring forth Shrubs and wild Fig-trees, which are generally hurtful to Buildings.

CHAP. V.

Of Lime, and how to work it.

STones whereof Lime is made, are either digg'd out of the Hills, or taken out of the Rivers: All Stones of the Hills are good which are dry, without any Moiſture, and brittle, having no Material in it, which when it paſſeth the Fire, ſhall leave the Stone leſs; therefore that Lime will be beſt, which is made of the hardeſt, ſound, and white Stone, and being burnt, remains a third part lighter than its Stone. There are alſo certain ſorts of Stone, the Lime whereof is very good for the ſetting of Walls. In the Hills of *Padua* they dig a rugged Stone, whoſe Lime is very good in Works which lie open, and in the Water; becauſe it preſently hardens, and endures very long. All digged Stones are better to make Lime than the gathered; and from a ſhady and moiſt Pit, rather that a dry: The White is better to work than the Brown. Stones which are gather'd in Rivers and Brooks, that is to ſay, Pebbles, make excellent Lime, and very white and neat work, therefore 'tis generally uſed for Finiſhing of Walls. All Stones, as well of the Hills as Rivers, are ſooner or later burnt, according to the Fire which is given them; but ordinarily they are burnt in Sixty Hours; Being burnt, wet them; but don't pour on the Water all at once, but at divers times, and frequently, (that they may not burn) 'till they be well Temper'd: Afterwards put them in a moiſt and ſhady Place without any Mixture, only cover them lightly with Sand; and by how much the more thoroughly they are ſteeped, ſo much the more rough and better they will be; except thoſe which

are

are made of rough Stones, as the *Paduan* ; becauſe they, as ſoon as they are wet, muſt be wrought, otherwiſe they waſte and burn away ; whence they will not hold, but become uſeleſs. For to make the Morter, you muſt ſo mix the Srnd, that taking of Pit-Sand, you muſt put three parts thereof with one of Lime ; if River or Sea-Sand, two parts thereof with one of Lime.

CHAP. VI.

Of Metals.

THE Metals uſed in Buildings, are Iron, Lead and Copper : Iron ſerves to make Nails, Hinges, and Chains to faſten the Doors, to make Doors themſelves, Grates, and the like Works. It is no where found and digged pure ; but when digged, is purged by the Fire, to the end it may be ſo melted, that it may run, and that before it be cool the Foulneſs may be taken away ; but after it is purg'd and cool'd it heats well, and becomes ſoft, and eaſy to be wrought and beat out with a Hammer. But it will not eaſily melt, if it be not again put into a Furnace made for that purpoſe : If being red-hot, it do not work nor yield to the Hammer, it waſtes and is ſpoiled. 'Tis a ſign of the Goodneſs of Iron, if in the Maſs you ſee the Veins continu'd ſtreight, without Interruption, and if the Ends of the Piece be clean, and without Soil ; becauſe the ſaid Veins ſhew if the Iron be without Knots and Puffs ; and you may underſtand the Middle by the Ends. Being wrote into Plates ſquare, or any other figure, if the Sides be even, you may conclude 'tis all alike good, having equally endur'd the Hammer.

With Lead they cover ſtately Palaces, Churches, Towers, and other Publick Buildings, and Gutters and Pipes to convey Water ; and therewith they faſten the Hinges and Iron-work in the Jaums of Doors and Windows. There are three ſorts thereof, White, Black, and of a Colour between both, and by by ſome called Aſh-colour; the Black is ſo called, not becauſe 'tis really Black, but becauſe being White, with ſome Blackneſs in it; therefore, in reſpect of the White the Antients, with Reaſon, gave it that Name. The White is more perfect and precious than the Black; the Aſh-colour is between both. Lead is digged either in great Lumps found by themſelves, or in ſmall Pieces, which ſhine with a certain Blackneſs, or elſe in very thin Flakes, amongſt the Rocks, Marble and Stones. All ſorts of Lead will eaſily run, becauſe with the Heat of the Fire it melts before it is red-hot: But put it into a very hot Furnace, it loſeth its Nature and Strength; for one part is changed into Litharge, and the other into Droſs. Of theſe ſorts of Lead, the Black is ſoft, and therefore eaſily wrought with the Hammer, and dilates much, and is very heavy. The White is harder and lighter, the Aſh-colour is much Harder than the White, and of middle Weight between both.

With Copper ſometimes they cover Publick Buildings; and the Antients made Nails, or Bolts, which faſtened in the Stones above and below, kept the Stones from falling out of order, and the Claſps or Hooks placed to hold two Stones together; and they uſed theſe Nails and Claſps, becauſe that Buildings, which can't poſſibly be made without many Pieces of Stones, may (by being thus join'd and bound together) as it were become one Stone, and ſo more ſtrong and durable. They alſo made Nails and Claſps of Iron, but more often of Copper, becauſe they will laſt longer, not being ſo ſubject to ruſt. Alſo they made Letters for Inſcriptions, which they placed on the Borders of Buildings: And we read, that of this Metal were the Hundred famous Gates of *Babylon*; and in the Iſles of *Cades*, the two Pillars of *Hercules*, Eight Foot high. That is eſteemed the beſt, which, burnt and extracted from Mineral by Fire, is Red, inclining to Yellow, *of a good Grain, and full of Holes*; for that is a ſign 'tis well purged, and free from Droſs. Copper may be heated like Iron, and made liquid, ſo that it may be Caſt: But in extreme hot Furnaces it will not endure the Force of the Flame, but totally conſume. Altho' it be hard, nevertheleſs it ſubmits to the Hammer, and dilates it ſelf into thin Leaves; it is beſt preſerved by Tar: And altho' it doth not ruſt like Iron, yet it hath a kind of Ruſt, which is called *Verdigreaſe*, eſpecially if it touch ſharp and liquid Things; of this Metal, mixed with Tin, or Lead, or Latten, (which is alſo Copper) and colour'd with *Lapis Calaminaris*, is made a Metal commonly call'd Braſs, which often times Architects do uſe, as in Baſes, Pillars, Capitols, Statues, and ſuch like. In *Rome* are four Columns of Braſs, (as St. *Giovanni Lateranno)* of which one only has its Capitol, and were made by *Auguſtus* of Metal which was taken from the Stems of Ships which he took in *Egypt* from *M. Antonio*: There remains alſo in *Rome* to this Day four Ancient Gates; which are thoſe of the *Rotunda*, which formerly was the *Pantheon*; that of St. *Coſmo* and *Damiano*, which was the Temple of *Caſtor* and *Pollux*, or rather of *Romulus* and *Remus*; and that which is in St. *Agnes* without the Gate *Viminalis*: But the moſt beautiful of all theſe, is that of St. *Maria Rotunda*, wherein thoſe Antients did endeavour to imitate by Art that kind of *Corinthian* Metal, in which the natural Yellow of Gold prevailed; For we read, that when *Corinth* was deſtroyed and burnt, (which now is called *Coranto*) thus they melted and mixed in one Maſs Gold, Silver, and Copper; and Fortune tempered and made the Mixture of three ſorts, which was afterwards called *Corinthian*; in one of them the Silver prevails, whence it remained White, and very near it in Luſter: In another the Gold prevailed, and remained Yellow and of a Gold Colour; and the third was where all theſe three Metals were of an equal Temperament: And theſe Species have been ſince divers ways imitated.

Hitherto I have diſcourſed of thoſe Things ſeeming moſt neceſſary to be Conſidered and Prepared before Building: It now remains that ſomething be ſaid of Foundations; the Materials whereof being prepared, the Work may be proceeded on.

LIBRARY

CHAP. VII.

Of the Qualities *of* Ground *wherein Foundations are to be laid.*

THE Baſe of the Building, is that which we call the Foundation, that is to ſay, the part which is under Ground, upholding the reſt of the Building that is above Ground; therefore, of all the Errors which do happen in Building, thoſe are the moſt pernicious which are committed in the Foundation, becauſe they bring with them the Ruin of the whole Fabrick, nor can without great Difficulty be amended: whence the Architects ought to uſe their utmoſt Diligence; becauſe in ſome Places they have a Natural Foundation, and in other Places 'tis neceſſary to uſe Art.

A Natural Foundation, is, when we build on Stone, a ſoft, ſandy, or mouldring Stone or Gravel; for theſe, without digging, or other helps of Art, are of themſelves excellent Foundations, and moſt fit to uphold the greateſt Buildings, both in Land, and in Water. But if Nature affords not a Foundation, it muſt be attempted by Art; and then the Place you have to build on is either a ſolid Earth, or a gravelly, ſandy, moſſy, ſoft and mooriſh Place. If the Earth be faſt and firm, you may dig ſo far as to a diſcreet Architect may ſeem requiſite for the Quality of the Building, and Soundneſs of the Earth; and (when you intend not to make Cellars, or other Under-ground Offices) your Depth is to be a ſixth part of the Height of the Building. To know this Firmneſs, Obſervation from the digging of Wells, Ciſterns, and ſuch-like, will help well; and 'tis alſo known by Herbs growing there, if they uſually ſpring up only in firm and faſt Grounds; and beſides, 'tis a ſign of firm Ground, if a great Weight thrown thereon, it neither ſounds nor ſhakes; and from the Report of Drums being ſet on the Ground, and lightly touched, it does not reſound again; and if Water put into a Veſſel, doth not ſhake: The neighbouring Places will alſo give you to underſtand the

Faſtneſs

Faſtneſs and Firmneſs of the Earth. But if the Place be Sandy or Gravelly, obſerve whether it be on Land, or in Water: For if it be on Land, you muſt take notice what hath been before directed concerning Faſt Ground; and if you build in a River, the Sand and Gravel is altogether uſeleſs; becauſe the Water, with its continual Stream and Flood, often changes its Bed; therefore dig 'till you come to a Bottom ſound and firm; or if that be difficult, dig ſomewhat in the Sand and Gravel, and then place Piles, whoſe Ends may reach to the ſound and good Earth, and upon thoſe you are to Build: But if you are to Build upon a Moſſy and Looſe Ground, then you muſt dig 'till you find Sound Earth, and therein alſo ſo much as the Bigneſs of the Walls and the Greatneſs of the Building require.

This Sound Ground (and fit to uphold Buildings) is of divers ſorts; for (as *Alberti* well ſaith) Somewhere ſo Hard, as *'tis ſcarce to be cut with Iron*, ſomewhere very Stiff, ſomewhere Blackiſh, ſomewhere Whitiſh (which is counted the weakeſt,) ſomewhere like Chalk, ſomewhere Sandy; of all theſe, the beſt is that which is cut with moſt Labour, and when wet, doth not diſſolve into Dirt.

You ſhould not Build upon a Ruin, or Old Foundation, if firſt of all you know not its Depth, and whether it be ſufficient to bear the Building: But if the Earth be Soft, and Sink much, as in Mooriſh Grounds, than you muſt place Piles, whoſe length muſt be an Eighth part of the height of the Wall, and in thickneſs a Twelfth part of their length: The Piles muſt be placed as cloſe as one can ſtand by the other, and are to be rammed in with Blows rather quick than heavy, ſo that the Earth may the better conſolidate and faſten. You muſt place the Piles, not only under the Out-Walls, upon the Trench or Gutters, but alſo under the Inner-Walls which divide the Buildings: For if you make the Foundation for the Inner-Walls different from thoſe Without, then laying Beams along one by the other, and others a-thwart them above, often-times it happens that the Inner-Walls fall down; when thoſe Without, being placed on Piles, ſtir not; whence all Walls come to cleave, the which render the Building ruinous, and is very uncomely to look on; wherefore you muſt avoid this Danger, making the Piling Work of leſs Charge; for, according to Proportion of Walls, the Piles in the Middle may be placed thinner than thoſe Without.

CHAP. VIII.

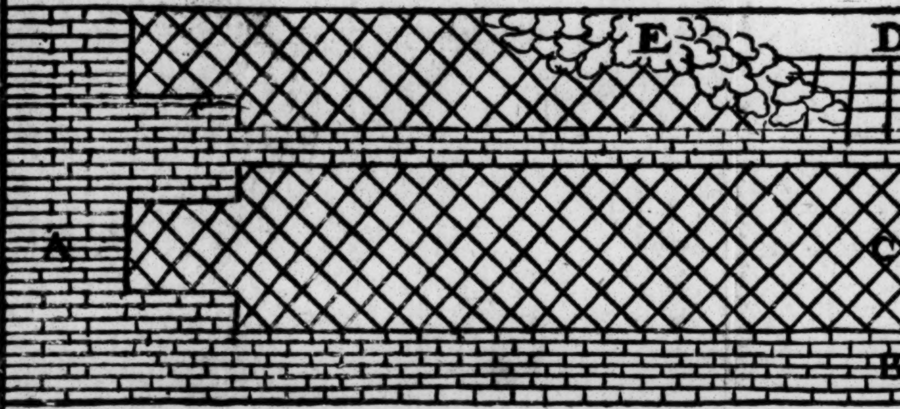
Of Foundations.

FOundations ought to be twice ſo thick as the Walls to be raiſed thereon; and therein the Quality of the Earth, and the Greatneſs of the Building, is to be regarded, making them more large in ſoft and looſer Ground, and where there is a great Weight to be ſuſtained. *The Plain of the Trench* muſt be Level, ſo that the Weight may preſs equally; and not inclining to one part more than another, may prevent the cleaving of the Walls. For this reaſon, the Antients uſed to pave the Plain with * *Tivertine*; and we lay Planks and Beams, and build thereon.

* Tivertine *a certain Stone brought from* Trivoli.

Foundations are made Sloping, that is to ſay, to Diminiſh as they riſe; yet ſo, that there may be ſo much left on one ſide as on the other, ſo that the middle of that above may fall perpendicularly upon the middle of the lower Work; which muſt be alſo obſerv'd in the Diminution of Walls above Ground; becauſe by this means the Building becomes much ſtronger, than be making the Diminutions any other Way.

There are ſometimes made, (eſpecially in Mooriſh Grounds, where there is need of Piles) to avoid Charge, Foundations diſcontinued, but with certain Vaults, upon which they afterwards Build. In great Buildings 'tis very commendable to make Vents through the Body of the Walls, from the Foundation to the Roof, becauſe they let forth the Wind, (which is very prejudicial to Buildings) leſſen the Charge, and are of no ſmall Convenience, if in them you make Winding-Stairs from the Bottom to the Top.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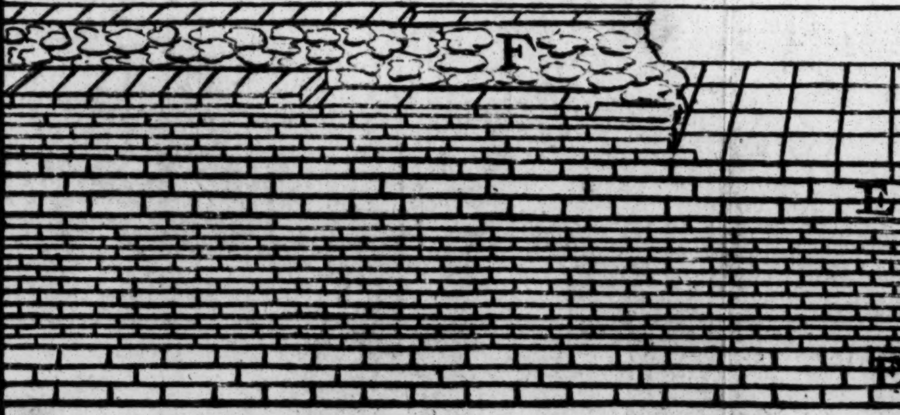
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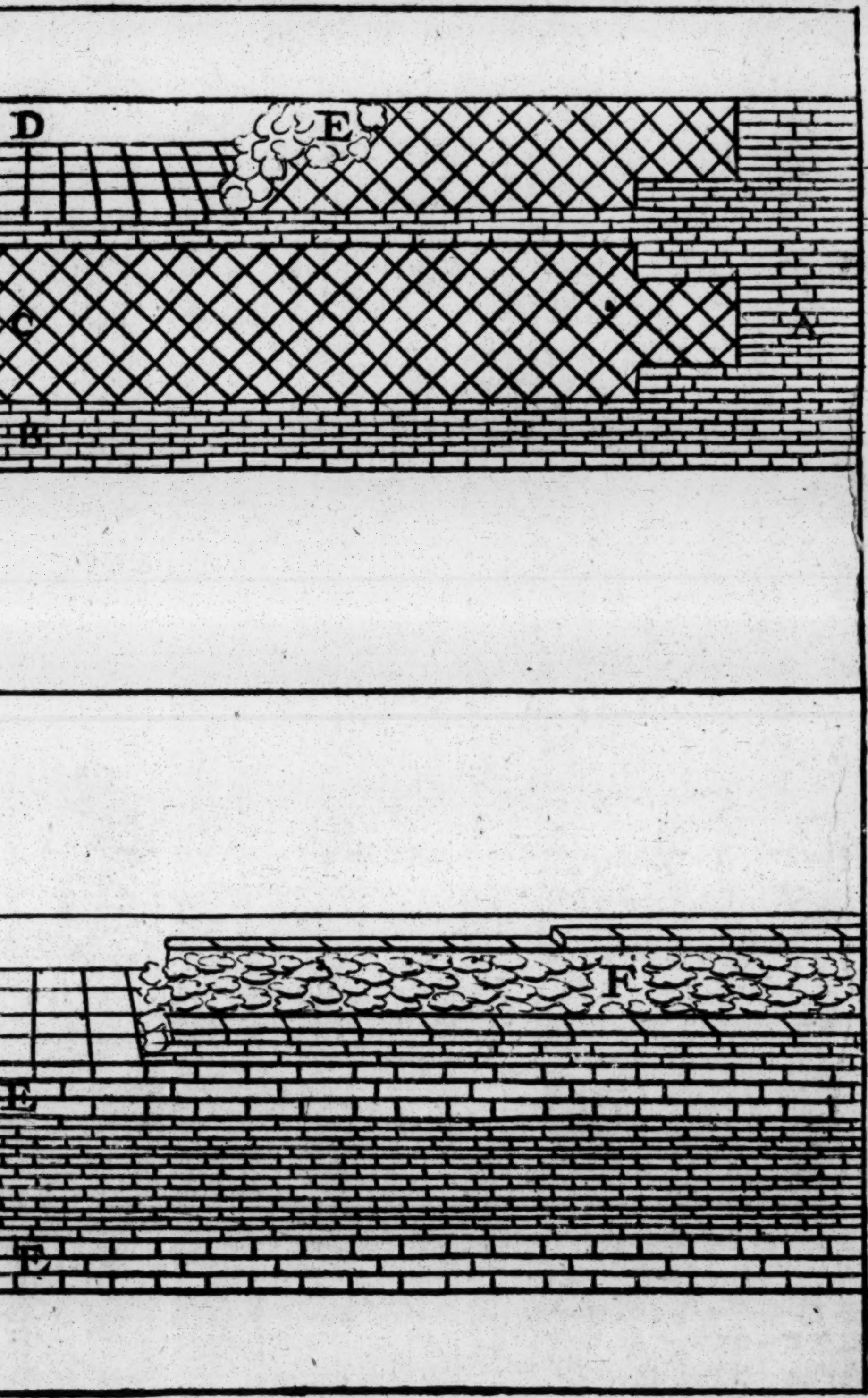
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CHAP. IX.

Of the Faſhion of Walls.

THE Foundations being laid, it remains that we treat of the Superſtructure. The Antients had Six ſorts of Walls: one call'd *Reticolata*, or *Net-work*; another of *Quadrels*, or *Brick*; a third of *Cement*, which is of rough Stones from the Hills or Rivers; a fourth of various Stones; a fifth of ſquared Stones; the ſixth *Riempiuta*, which is alſo called *Coffer-work.* Of the *Net-work* there is no uſe at all in theſe Days; but becauſe *Vitruvius* relates it was common in his Time, I do here put alſo that Deſign. They made the Coignes and Corners of their Building of *Quadrels*, and every two Foot and half took up three Courſes of *Quadrels*, which bound the whole Thickneſs of the Wall.

A	*Coignes, or Corners of Quadrels.*
B	*Courſes of Quadrels, which bind the whole Wall.*
C	*The Net-work.*
D	*The Courſes of Quadrels through the Thickneſs of the Wall.*
E	*The Inner part of the Wall made of Cement.*

Walls of *Brick*, or *Quadrels*, both thoſe about Cities, and other grear Edifices, muſt be made, that the inſide and outſide may be of *Quadrels*, and in the middle filled up with Cement, and with Brick, Earth and Stone, ramm'd together; and to every three Foot in Height there muſt be three Courſes of *Quadrels* of the biggeſt ſort, which may take the whole Breadth of the Wall. And the firſt Courſe muſt be laid with the length inward, that the leſſer part of the Brick be expoſed; the ſecond the length laid ſidewiſe; and the third as the firſt: Of this ſort are the Walls of the *Rotunda* in *Rome*, and the Baths of *Diocleſian*, and all other ancient Buildings which are there.

E *The Courſes of Quadrels, which bind the whole Wall.*
F *The middle part of the Wall made of Cement, between one Courſe and the other, and the outward Quadrels.*

The Walls of *Cement* muſt be made ſo, that to every two Foot at leaſt there be three Courſes of *Quadrels* or *Brick*, and that the *Quadrels* or *Brick* be prepared according to the manner aforeſaid. Such are the Walls of *Turin* in *Piedmont*, which are made of River-Pebbles ſplit in the middle, which being placed with the ſplit ſide outwards, make very even and ſmooth work. The Walls of the *Arena* of *Verona* are likewiſe of *Cement*, and there are three Courſes of *Quadrels* to every three Foot: And in like manner are made other ancient Edifices, (as appears in my Book of *Antiquities.*)

G *Cement or River-Pebbles.*
H *Courſes of Quadrels which bind the whole Wall.*

The *Walls of Irregular Stones*, were ſo called, becauſe they were made of Stones of unequal Sides and Angles; and to make theſe Walls, they uſed a Plumb-Rule, which applied to the Place where the Stone was to be put, ſerved to place them ſtraight and even, thereby to try, time after time, if the Stone ſtood right in the deſigned Place. Of this ſort may be ſeen Walls at *Preneſte*; and ancient Streets were paved in this Manner.

I *Irregular Stones.*

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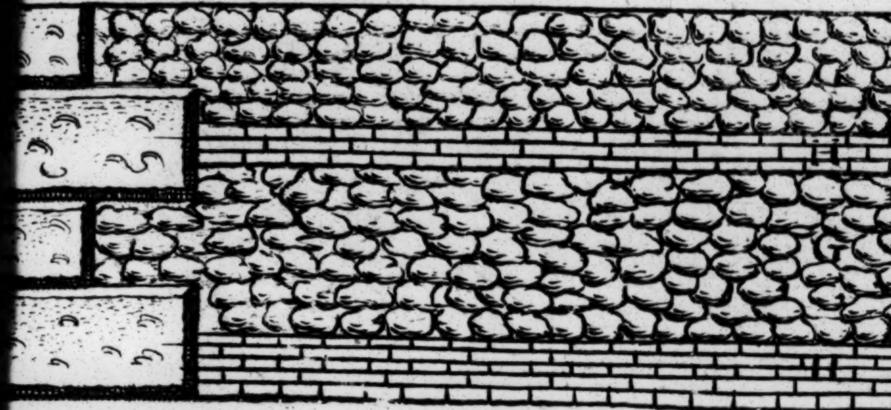

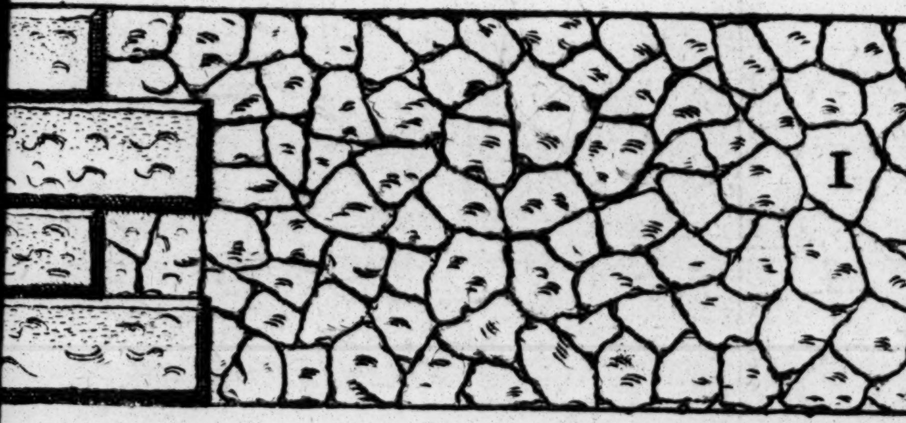

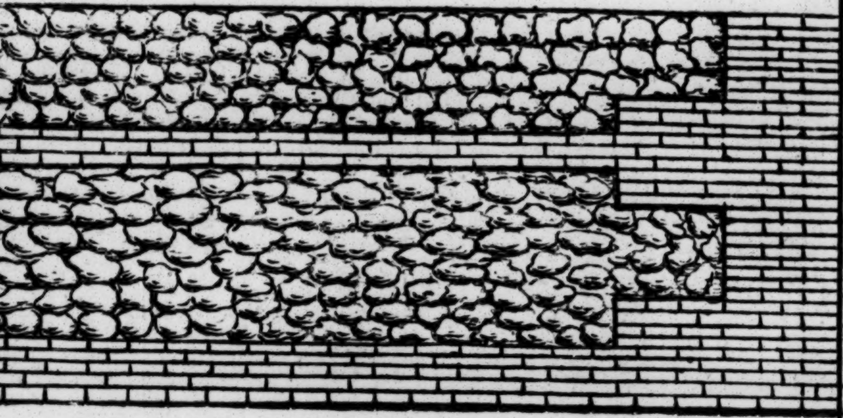

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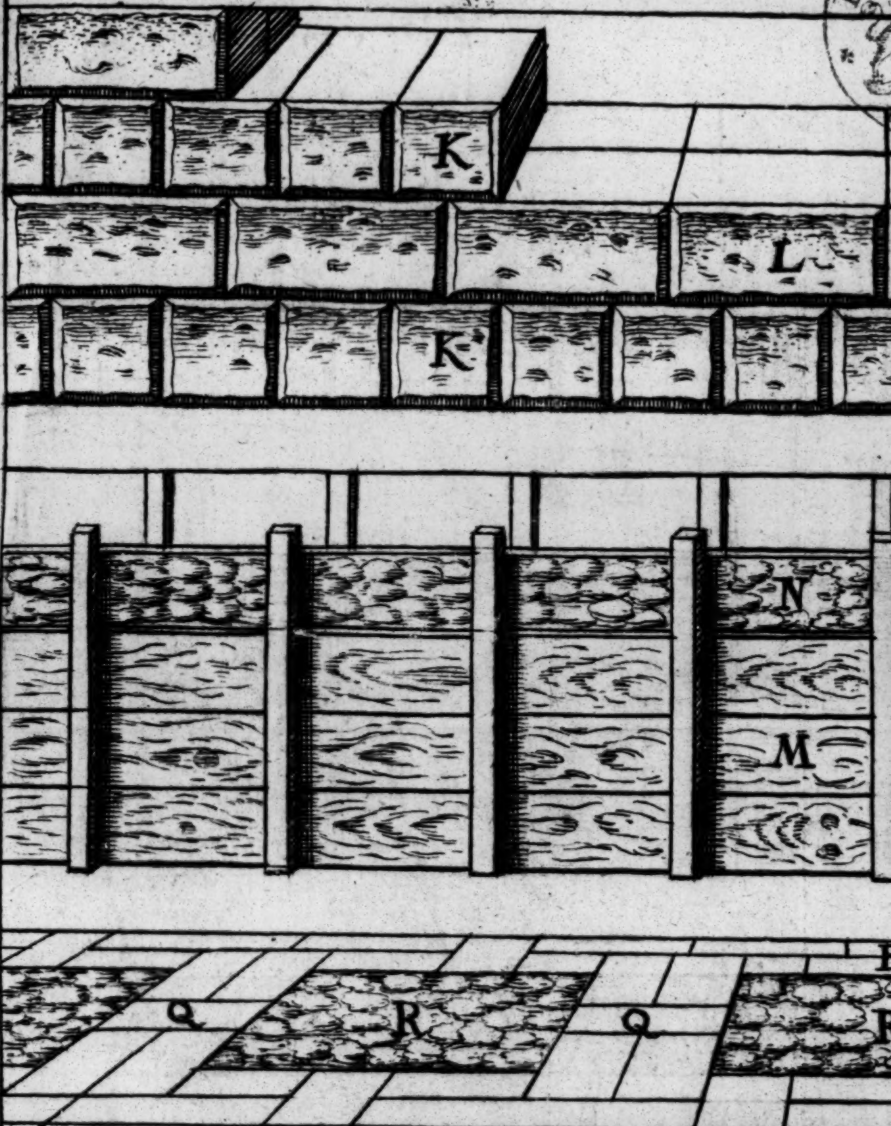

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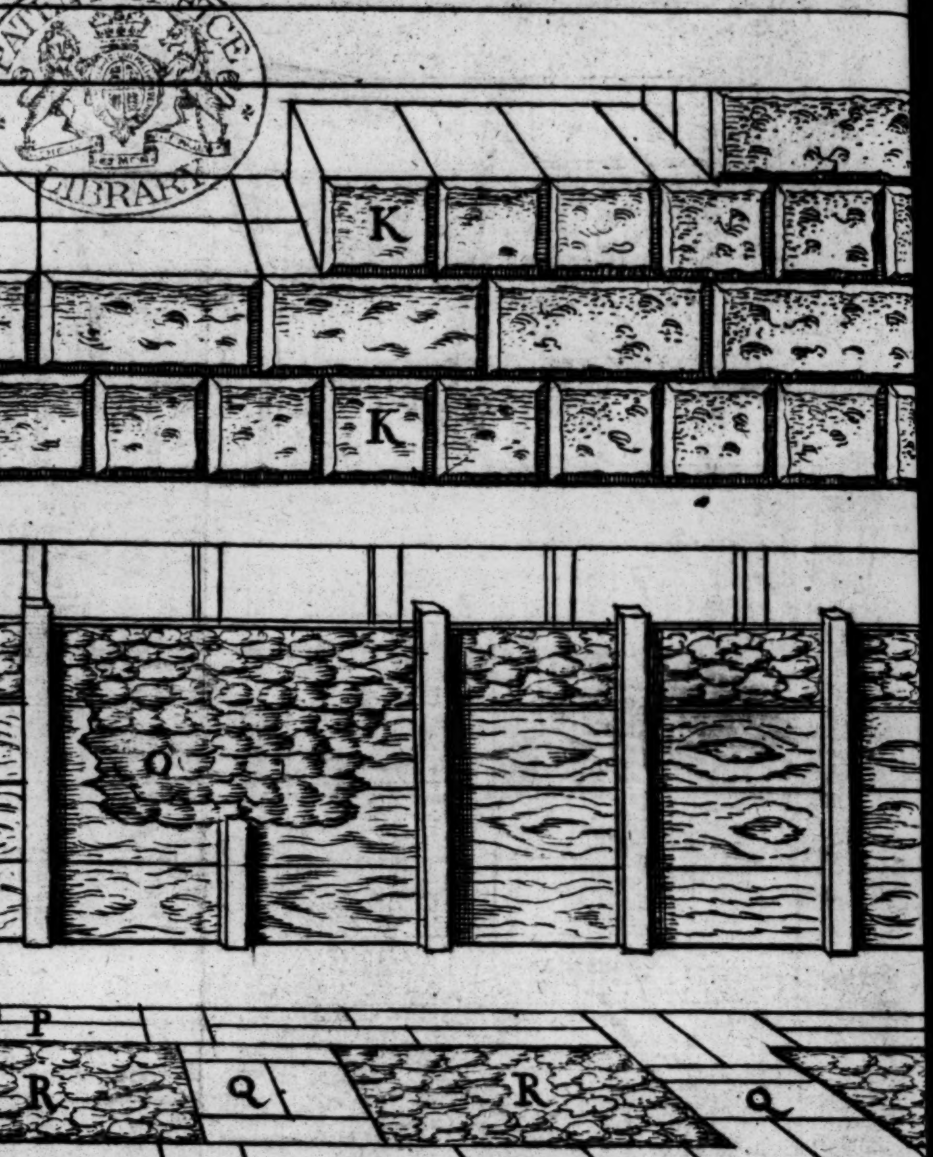


At *Rome* may be ſeen Walls of ſquared Stones, where was the Piazza and the Temple of *Auguſtus*, in which they locked in the leſſer Stones with Courſes of greater.

K *Courſes of leſſer Stones.*
L *Courſes of bigger Stones.*

The Manner of *Riempiuta*, or Filled Walls, which is alſo called *Coffer-work*, which the Antients did uſe; taking Planks and placing them edgewiſe, allowing ſo much Space as they would have the Thickneſs of the Wall, filling it with Morter and Stones of all ſorts mingled together; and ſo they went on from Courſe to Courſe. There is ſeen ſuch-like Walls at *Sermion* upon the Lake *de Grada*.

M *Planks upon Edgewiſe.*
N *The Inner part of the Wall.*
O *The Face of the Wall, the Planks taken away.*

Of this kind may be call'd the ancient Walls of *Naples*, which had two Walls of ſquared Stones four Foot thick, and ſix Foot diſtant the one from the other: Thoſe Walls were bound together with other Croſs-Walls; and the *Caſes* which were between the Traverſe-Walls and the Out-Walls were four Foot ſquare, and were fill'd up with Stones and Earth.

P *The Outward Stone-Wall.*
Q *The Traverſe Walls.*
R *Caſes filled with Stones and Earth.*

Theſe were the Forms of which the Antients did ſerve themſelves; and the Footſteps thereof are ſtill to be ſeen: whence it may be concluded, that Walls, of what ſort ſoever, ought to have ſome Tires, or Courſes, which are like Sinews that hold faſt all other Parts together, which chiefly may be obſerved when Walls are made of Brick: For the Structure, through Age, falling aſunder in the middle, the Walls may not become ruinous; as hath happen'd and is ſeen in many Walls, eſpecially on that ſide which reſpects the North.

CHAP. X.

Of the Method which the Antients did practiſe, in making their Stone Buildings.

BEcauſe it happens that ſometimes Buildings are made (the whole, or good part) of Marble, or ſome other great Stones, I think it convenient, in this Place, to acquaint you what the Antients did in ſuch Caſes: For we may obſerve in their Work, that they were ſo diligent in joining their Stones together, that in many Places their Connexion can ſcarcely be perceived. And beſides, the Beauty, Firmneſs, and Duration of the Fabrick is very much to be regarded.

And, foraſmuch as I can underſtand, they firſt ſquared and wrought the Sides of the Stones which were to be placed one upon the other, leaving the other Sides rough, and ſo uſed them, whereupon the Edges of the Stones were beyond the Square; and might manage them better, and more variouſly attempt to place them right, without danger of breaking, than if they had been ſquared on all Sides before: For when the Edges are made ſquare, or leſs than ſquare, they are very weak, and ſubject to Accidents. In this manner they made all Building rough, or, as one may ſay, ruſtick; and that being done, they go on working and poliſhing the Face of the Stone which is to be ſeen. It is true, that the Roſes which are between the Modilions, and other ſuch-like Onaments of the Cornice, could not commodiouſly be done when the Stones are fixed; therefore they made them while they were on the Ground. This is well atteſted by many ancient Buildings, where may be ſeen many Stones rough and unpoliſhed. The Arch by the old Caſtle in *Verona*, and all other the Arches and Buildings there, were done in the ſame manner; which is eaſily made out, by One curious in obſerving the Marks of their Tools, that is to ſay, the Manner how the Stones were Wrought: The Pillars of *Trajan* and *Antonine* in *Rome* were ſo made; nor could they otherwiſe have ſo exactly joined the Stones that might ſo cloſely meet where they go croſs the Heads, and other Parts of the Figures. And the ſame may be ſaid of the other Arches which are there. And

And if the Works were very great, as the *Arena* of *Verona*, the Amphitheatre of *Pola*, and the like, to ſave Charge and Time, which they would have required, they wrought only the Impoſts of the Arches, Capitols, and the Cornices, and the reſt they left Ruſtick, having only regard to the fair Front of the Buildings. But in the Temples and other Buildings which required Curioſity, they ſpared no Pains in the working them, and glazing and ſmoothing ev'n the very Fluces of the Columns, and poliſhing them diligently. Therefore, in my judgment, you ſhould not make Walls of Brick in the Ruſtick Manner, much leſs Mantles of Chimneys, which require curious Work; for beſides the Unhandſomneſs, 'twill happen that they will ſplit and divide aſunder, which naturally ought to be entire; but according to the Greatneſs and Quality of the Building, you may make them Ruſtick or Polite: And in a Work that requires altogether Neatneſs, we need not do as the Antients uſed, and that with very good Reaſon, being neceſſitated by the Greatneſs of their Works.

CHAP. XI.

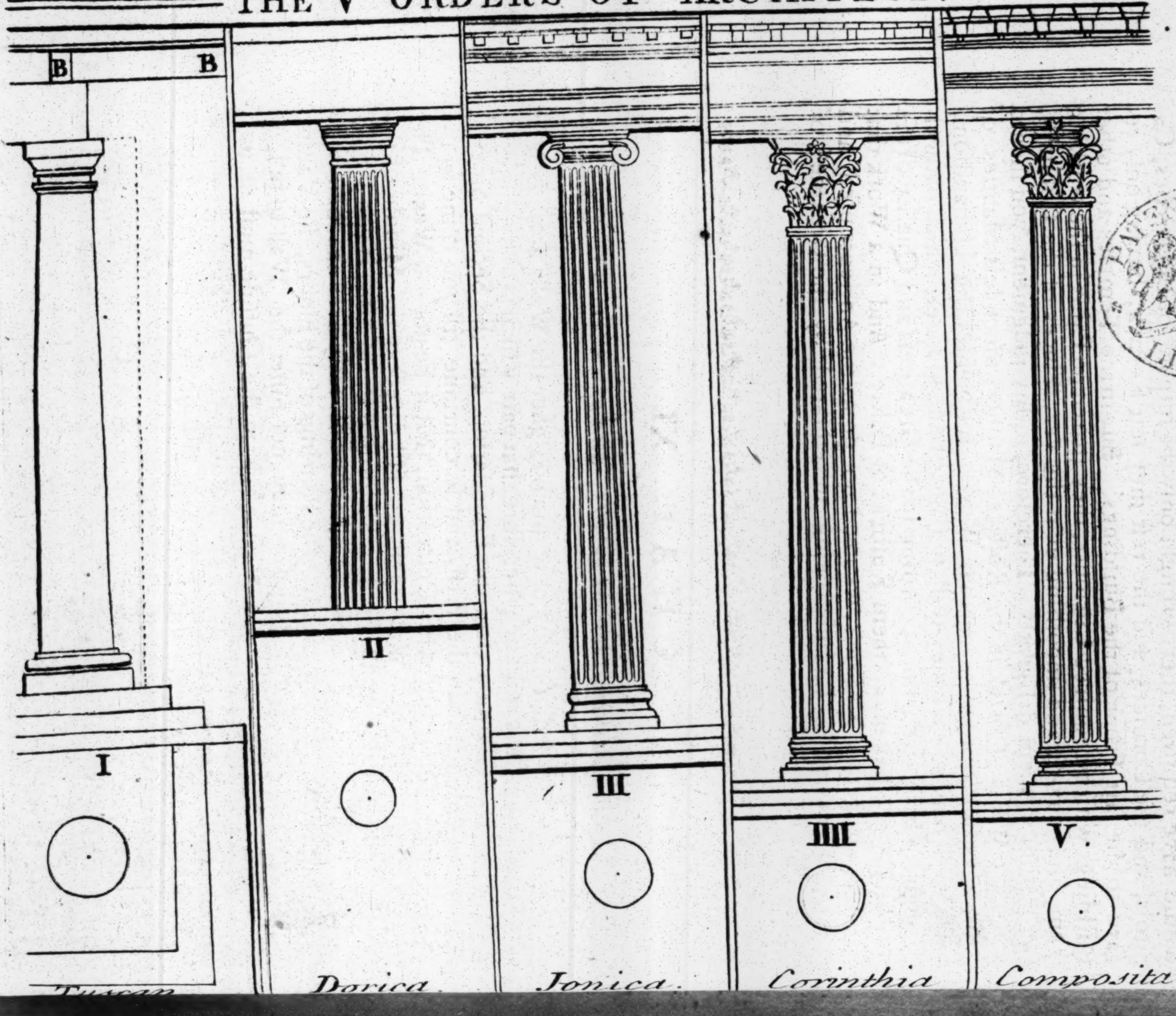
Of the Diminution of Walls, and of their Parts.

IT is to be Obſerved, That by how much Higher the Walls are, ſo much the Narrower they muſt be; therefore that part which is above Ground is to be one half Thinner than the Foundation, and the Second Story a half Brick Thinner than the Firſt, and ſo continue 'till you come to the Top of the Building, but with Deſcretion, that it be not too Weak. The Middle of the Upper Wall ought to fall direct to the Middle of the Lower, that ſo all the Walls be in a Pyramidal Form. But if you would make a Superficies or Face of a Wall above directly over that below, it muſt be on the Inner part; becauſe the Raftings of the Floors, the Vaults, and other Supports of the Building may not ſuffer the Wall to fall, or give way. The Diſcharged part which is on the Outſide muſt be ſupplied with a Border or Cornice encompaſſing the whole Building, which will be an Ornament and Faſtning to the whole Fabrick.

The Angles, becauſe they partake of both Sides, and are to keep them upright and faſt together, muſt be very ſtrong and held with long and hard Stones, as it were with Arms; therefore the Windows and Apertures muſt be as far from them as may be; or at leaſt, ſo much Space muſt be left between the Aperture and the Angle, as is the breadth of the Aperture.

Having ſpoken of meer Walls, 'tis convenient to paſs to the Ornaments, the greateſt whereof are the Columns, when they are meetly placed, and have fair Proportion to the whole Fabrick.

THE V ORDERS OF ARCHITECT.



CHAP. XII.

Of the Five Orders uſed by the Antients.

FIve were the Orders among the Antients, that is to ſay, the *Tuſcan*, *Dorick*, *Ionick*, *Corinthian*, and *Compoſita*, which ought to be ſo diſpoſed in the Building, that the ſtrongeſt be ſet loweſt; for then 'twill be capable to bear the Weight, and the Building will have a more ſure Foundation; wherefore they always place the *Dorick* under the *Ionick*, the *Ionick* under the *Corinthian*, and the *Corinthian* under the *Compoſita*: The *Tuſcan*, as being rude, ſeldom is uſed above Ground unleſs in a Building of one Order only, as in Town-houſes, or in vaſt Buildings, as Amphitheatres, and ſuch-like, where being many Orders, this, inſtead of the *Dorick*, is placed under the *Ionick*; and if you leave out one of them, and place, for example, the *Corinthian* immediately over the *Dorick*, which may be done according to the Rule aforeſaid, provided always that the more ſolid be the loweſt, I ſhall ſet down particularly the Meaſure of each of theſe Orders; not ſo much according to the Doctrine of *Vitruvius*, as according to my own Obſervations in Ancient Buildings: But firſt I will ſay thoſe Things which belong to all in general.

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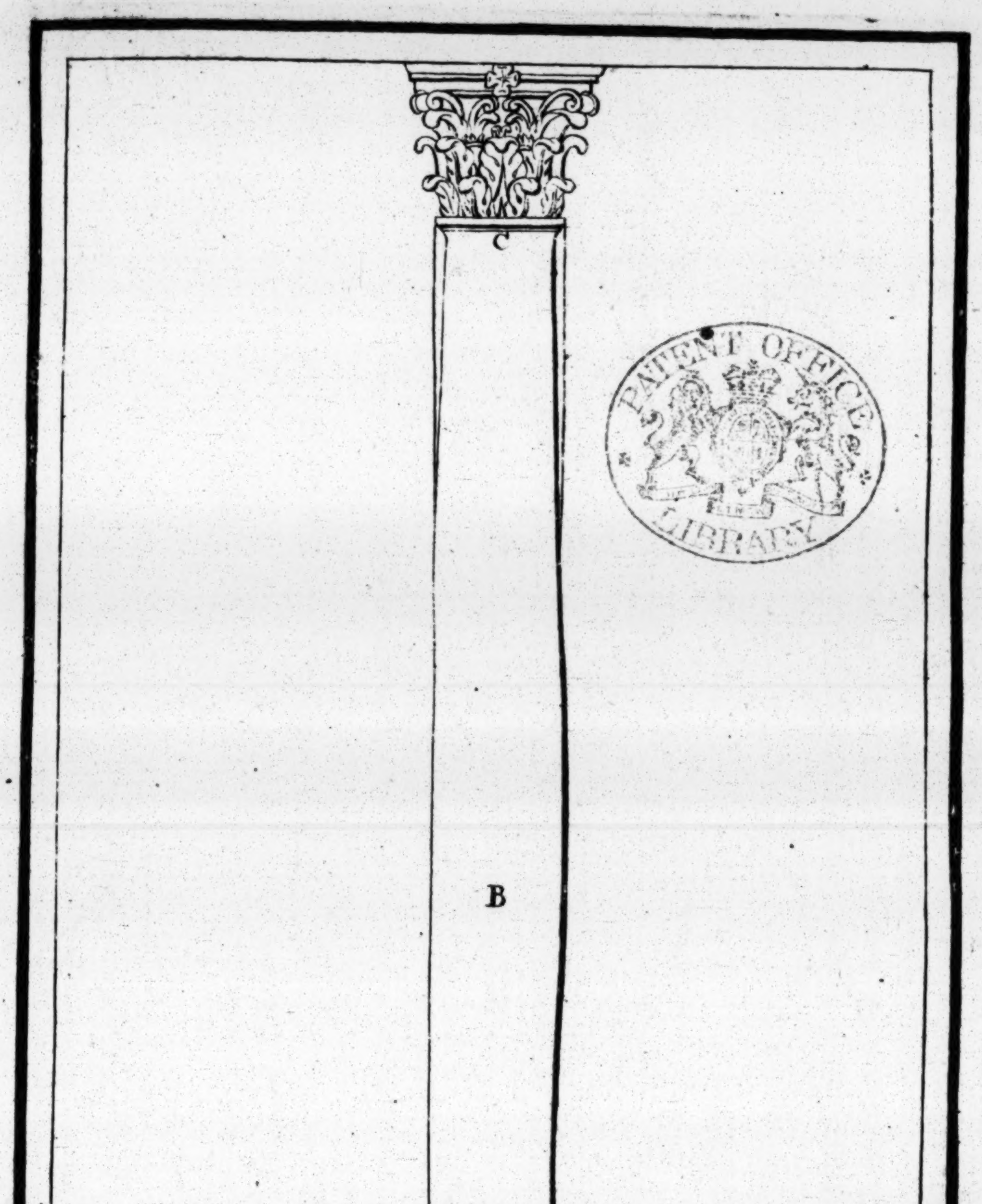
CHAP. XIII.

Of the Swelling of Columns, and their Diminutions: Of Inter-Columns and Pilaſters.

COlumns of every Order muſt be ſo formed, that the upper part muſt be leſſer than the lower, and the middle ſomewhat thick: In Diminiſhing, it muſt be obſerved, that by how much longer the Columns are, ſo much the leſs muſt they be diminiſhed, in regard that the Height of it ſelf works the Effect of Diminiſhing by the Diſtance; therefore if the Column be 15 Foot high, the Diameter of the Column below muſt be divided into 6 ½ Parts, and the Diameter thereof above ſhall be 5 ½ of thoſe Parts. If from 15 to 20, the Diameter below muſt be divided into ſeven Parts, and ſix ½ muſt be the Thickneſs of the upper Part; ſo likewiſe thoſe which are from 20 to 30, the Diameter below muſt be divided into 8 Parts, and 7 muſt be the Diameter of the upper Part; and ſo the Columns which are higher are to be diminiſhed proportionably by their ſeveral Parts, (as *Vitruvius* ſhews in his Second Chapter of his Third Book.) But now the Swelling is to be made in the Middle, we have no more to ſhew from him than a bare Promiſe, and therefore many have written variouſly thereof. I am wont to make the Profile of the ſaid Swelling in this Manner; I divide the Body of the Column into three equal parts, and leave the lower third part perpendicular; at the end of which I lay a long thin Rule as long as the Column, or a little more, and move that part which reacheth from the third part upwards, and bend it 'till the end touch at the Point of the Diminution, at the top of the Column under the *Collarino* or *Aſtragal*; according to that Bending I proceed, and ſo the Column becomes ſomewhat ſwelled in the middle, and appears very handſome; and although I could not have contrived (beſides this) a Form either ſhorter, or more expedient, or that might be more acceptable, I am yet more confirmed in this my Opinion; ſince it hath ſo much pleaſed *Pr. Cattaneo*, that (I having told him of it) he hath put it into one of his Works of *Architecture*, with which he hath not a little illuſtrated this Profeſſion.

A B *The third part of the Column, which is perpendicular.*
B C *The two thirds diminiſhed.*
C *The Point of the Diminution under the* Collarino *or* Aſtragal.



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The Inter-Columns, that is to ſay, the Spaces between the Columns may be made of a Diameter and $\frac{1}{2}$ of the Column; and the Diameter is to be taken at the lower part of the Column of two Diameters of two and $\frac{1}{4}$, of three, and ſometimes of more. But the Antients were not wont to allow more than three Diameters of the Column, except in the *Tuſcan* Order, in which the Architrave is wont to be of Wood; they made the Inter-Columns very large, not leſs than a Diameter and $\frac{1}{2}$; and this Space they allowed ſometimes, eſpecially when they made the Columns very big: But thoſe Inter-Columns were moſt preferred that were of two Diameters and $\frac{1}{4}$ of the Column; and they accounted this the moſt noble and beautiful Manner of the Inter-Columns.

And you ought to take notice, that between the Inter-Columns and the Columns there ought to be Proportion and Correſpondence; for leaving too much Vacancy between ſmall Columns, you will take away great part of their Beauty, becauſe the great quantity of Air that will be between them will very much diminiſh their thickneſs; and on the the other hand, leaving too little Space to the great Columns, by the Streightneſs and Narrowneſs of the Spaces, they will appear Gouty and very Ungraceful: therefore if the Spaces exceed three Diameters, you muſt make the Columns in Thickneſs a ſeventh part of their Height, (as I ſhall obſerve hereafter in the *Tuſcan* Order;) but if the Spaces ſhall be 3 Diameters, the Length of the Column muſt be 7 $\frac{1}{2}$ or 8, as in the *Dorick* Order; and if 2 $\frac{1}{4}$, the Length of the Column muſt be 9 Diameters, as in the *Ionick*; if 2, the Length of the Column muſt be 9 $\frac{1}{2}$ Diameters, as in the *Corinthian*: Laſtly, if 1 $\frac{1}{2}$, the Length of the Column muſt be 10, as in the *Compoſita*. Concerning theſe Orders, I have taken this Care, that they may be Examples for all other Inter-Columns, (which *Vitruvius* intimates in the Chapter aforeſaid.)

In the Front of Buildings the Columns ought to be an even number, ſo that the middle Inter-Columns may be made bigger than the reſt, that the Doors and Entries may be the better ſeen, which uſually are placed in the middle. And thus much for Pillar-work only.

But if Galleries be made with Pilaſters, they muſt be ſo diſpoſed, that the Pilaſters be not leſs than a third of the Vacancy between

between Pilaſter and Pilaſter; and thoſe at the Corners muſt be two thirds bigger than the other, that ſo the Angles of the Fabrick may be firm and ſtrong; and when they are to ſupport an extraordinary great Weight, as in very great Buildings, then they muſt be the half of the Vacancy, as thoſe of the Theatre of *Vicenza*, and the Amphitheatre at *Capua*: or elſe two thirds, as thoſe of the Theatre of *Marcellus* in *Rome*; and of the Theatre of *Ogubas*, which now belongs to Signior *Lodovico de Gabrielli* a Gentleman of that City. The Antients alſo made them ſometimes as large as the whole Vacant, as in the the Theatre of *Verona*, in that part which is not upon the Hill. But in private Buildings they are not to be made leſs than a third of the Vacant, nor larger than two thirds; and they ought to be Square; but to ſave Charge and to make Room to walk more freely, they may be made leſs in the Flank than in the Front.

And to adorn the Frontiſpiece, you may put in the middle of the Front half Columns, or other Pilaſters, which may bear up the Cornice which ſhall be upon the Arches of the Gallery; and they muſt be as large as their height ſhall require, according to their ſeveral Orders; as in the enſuing Chapters and Deſigns may appear: For the underſtanding whereof, (that I may not repeat the ſame thing often) you may obſerve, that I, in the dividing and meaſuring the ſaid Orders, would not take a certain and determinate Meaſure which is peculiar to any City, as Cubit, Foot, or Span, well knowing that Meaſures are as various as the Cities and Countries: But, in Imitation of *Vitruvius*, who divides the *Dorick* Order with a Meaſure taken from the Thickneſs of the Column, which is common to all, and by him call'd a *Module*; I will alſo ſerve my ſelf with ſuch a Meaſure in all the Orders, and the *Module* ſhall be the Diameter of the Column, taken at the Baſe, divided into 60 Parts, except in the *Dorick*, in which the *Module* is to be the Half Diameter of the Column, and is dided into 30 Parts; for ſo it falls more commodious in the Compartments of the ſaid Order. Wherefore every one may ſerve himſelf (making the *Module* greater or leſs, according to the Quality of the Fabrick) with the Proportions and Profiles deſigned, convenient to every Order.

CHAP.

CHAP. XIV.

Of the Tuſcan *Order.*

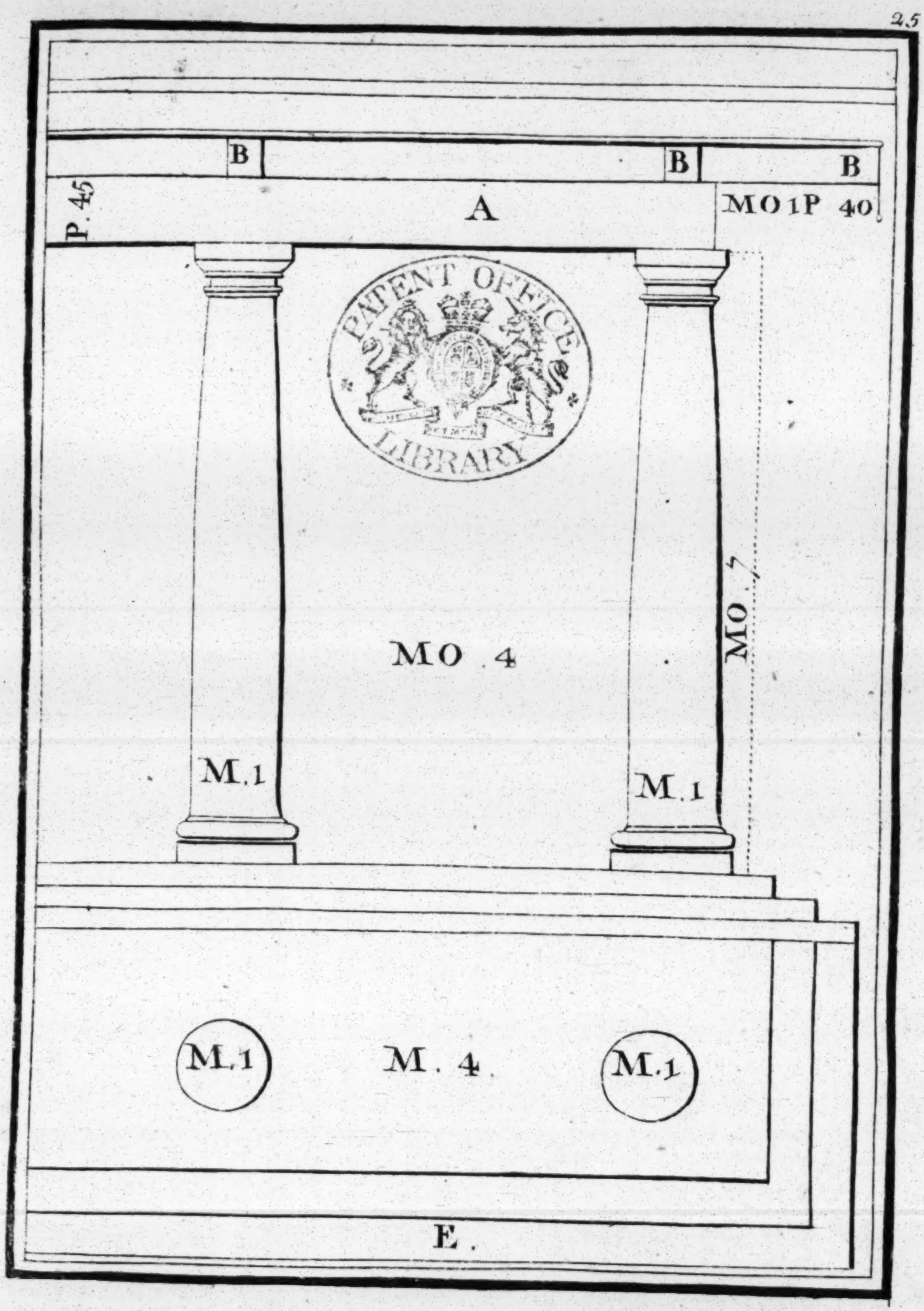
THE *Tuſcan* Order, according to that which *Vitruvius* writes of it, and is ſo indeed, is the moſt ſimple and intire of all the Orders, of Architecture; becauſe it retains the moſt of Antique way, and wants all thoſe Ornaments which render the others ſo pleaſant and agreeable. This had its Original in *Tuſcana*, a Place very remarable in *Italy*, whence the Name is derived.

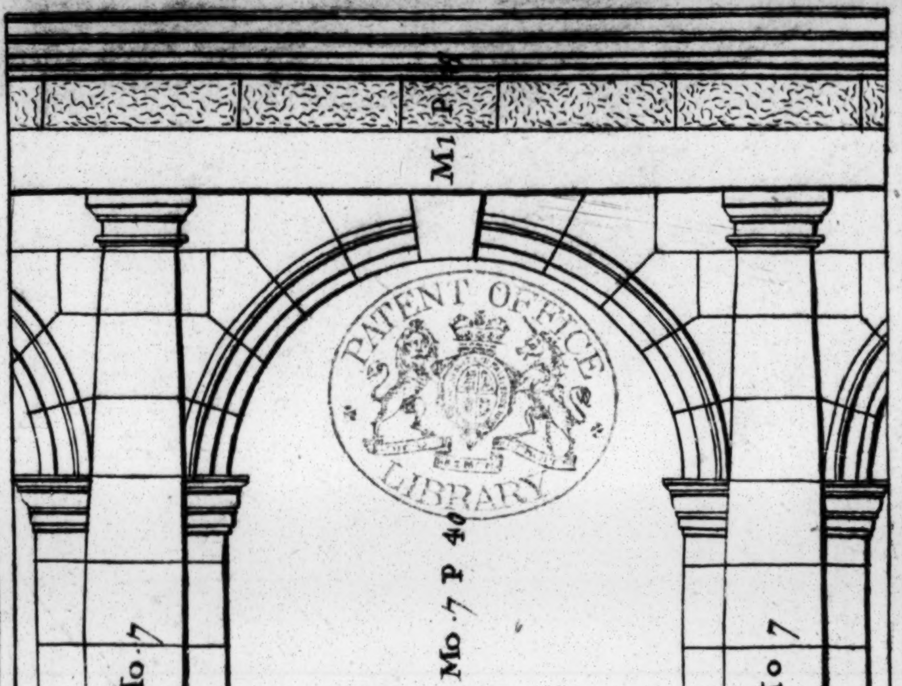
The Column, with its Baſe and Capitol, ought to be in Length ſeven Models, and at the Top are diminiſhed a fourth part of their Diameter. Having occaſion of a Row of Columns of this Order only, you may make the Inter-Columns very large; becauſe the Architraves may be of Wood, and will be very convenient for Country Uſe, for the Paſſage in and out of Carts, and other Country Conveniences; and beſides, the Charge will be leſs: But if you make Gates or Galleries with Arches, you muſt obſerve the Meaſures that I have marked in the Deſign, in which you may obſerve the Stones ſo diſpoſed or joined together, as when the whole Work is of Stone; the which I have alſo directed in the Deſigns of the four Orders.

And this way of diſpoſing and faſtning the Stones, I have derived from many ancient Arches, as appears in my Books of *Arches*; and herein I have uſed great Diligence.

A *Architrave of Wood.*

B *The Ends of the Summers which bear up the Projecture of the Cornice.*


B
B
B
P. 45
A
MO 1 P 40
MO .7
MO .4
M.1
M.1
M.1
M. 4.
M.1
E.



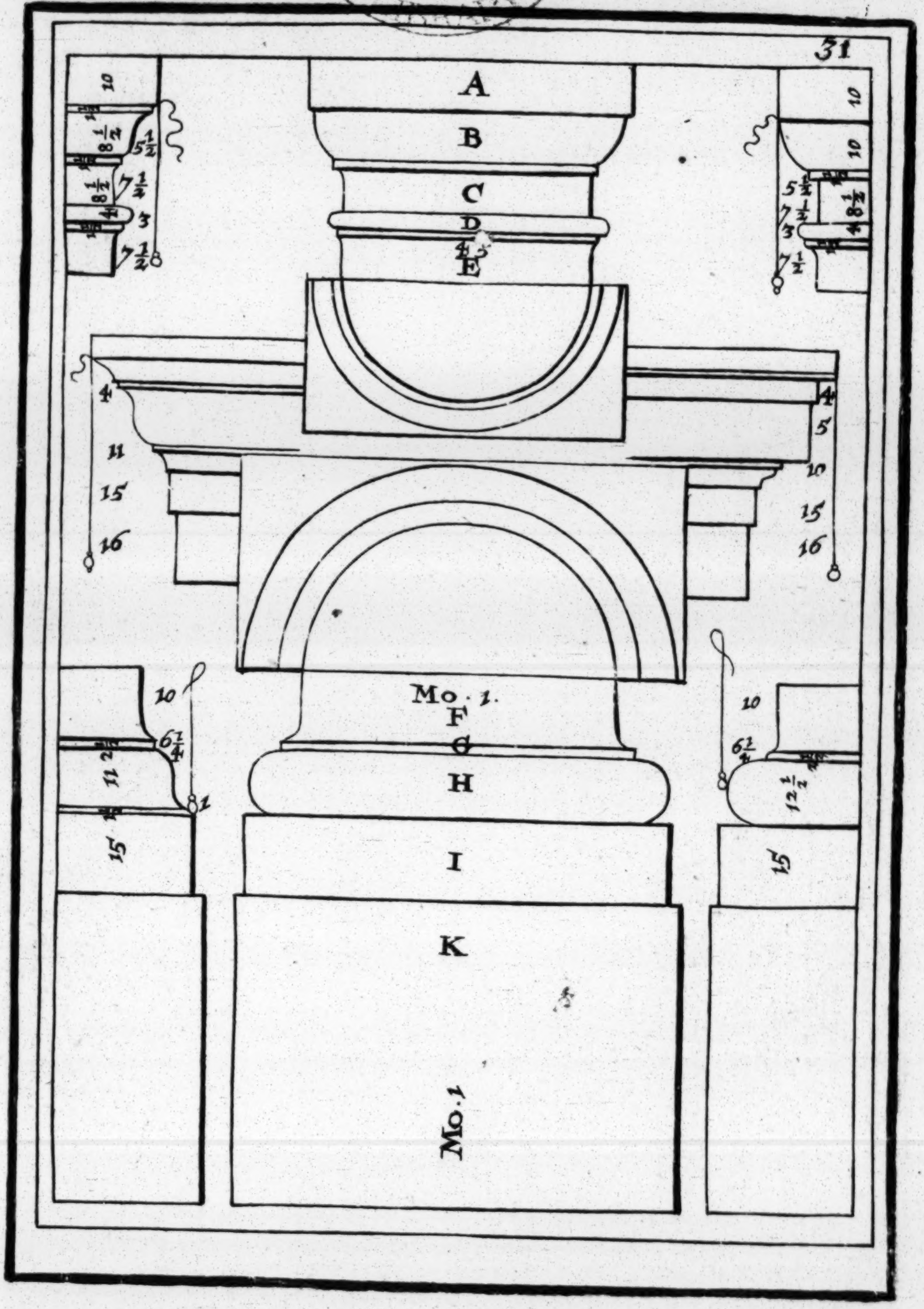
E . 2.

The *Pedeſtals* which are made under the Columns of this Order, muſt be the height of one Model, and made plain. The height of the Baſe is to be the half Diameter of the Column. This height muſt be divided into two equal parts ; one is given to the *Orlo* or *Plinth*, which muſt be made round ; the other is divided into four parts : One for the *Liſtella* or *Cincture*, which may be made a little leſs, and is alſo called *Cimbia* ; and in this Order only is part of the Column, the other three are for the *Torus*. The *Projecture* of this Baſe is a ſixth part of the Diameter of the Column below. This *Capitol* is the height of half the Diameter of the Column below, and is divided into three equal parts. One is given to the *Abacus*, which from its Form is commonly called *Dada*, or *Dye*. The other to the *Ovolo* or *Echinus* : And the third is divided into ſeven parts ; of one is made the *Liſtella* under the *Ovolo*, and the other ſix remain to the *Collarino* or Neck of the Column. The *Aſtragal* is double the height of the *Liſtella* under the *Ovolo*, and the Centre thereof is made upon the Line, which falls plumb upon the ſaid *Liſtella* ; and upon the ſame Line doth fall the Projecture of the *Cimbia*, which is as thick as the *Liſtella*. The *Projecture* of the *Capitol* anſwers to the Body of the Column below ; its Architrave is made of Wood as high as broad, and the breadth ought not to exceed the Body of the Column at the Top. The *Summers* which carry on the *Eaves*, projecteth a fourth part of the length of the Column. Theſe are the Meaſures of the *Tuſcan* Order, (as *Vitruvius* teacheth.)

An *Abacus*.

A	*Abachus.*
B	*Echinus.*
C	*Hypotrachelium, or Frize of the Capital.*
D	*Aſtragal.*
E	*Body of the* Column *above.*
F	*Body of the* Column *below.*
G	*Annulet* Cincture, *or Liſtella.*
H	*Torus.*
I	*Orle or Plinth.*
K	*Pedeſtal or Stylobatum.*

The *Profiles*, which are placed by the Plain of the Baſe and Capital, are the Impoſts of the Arches.

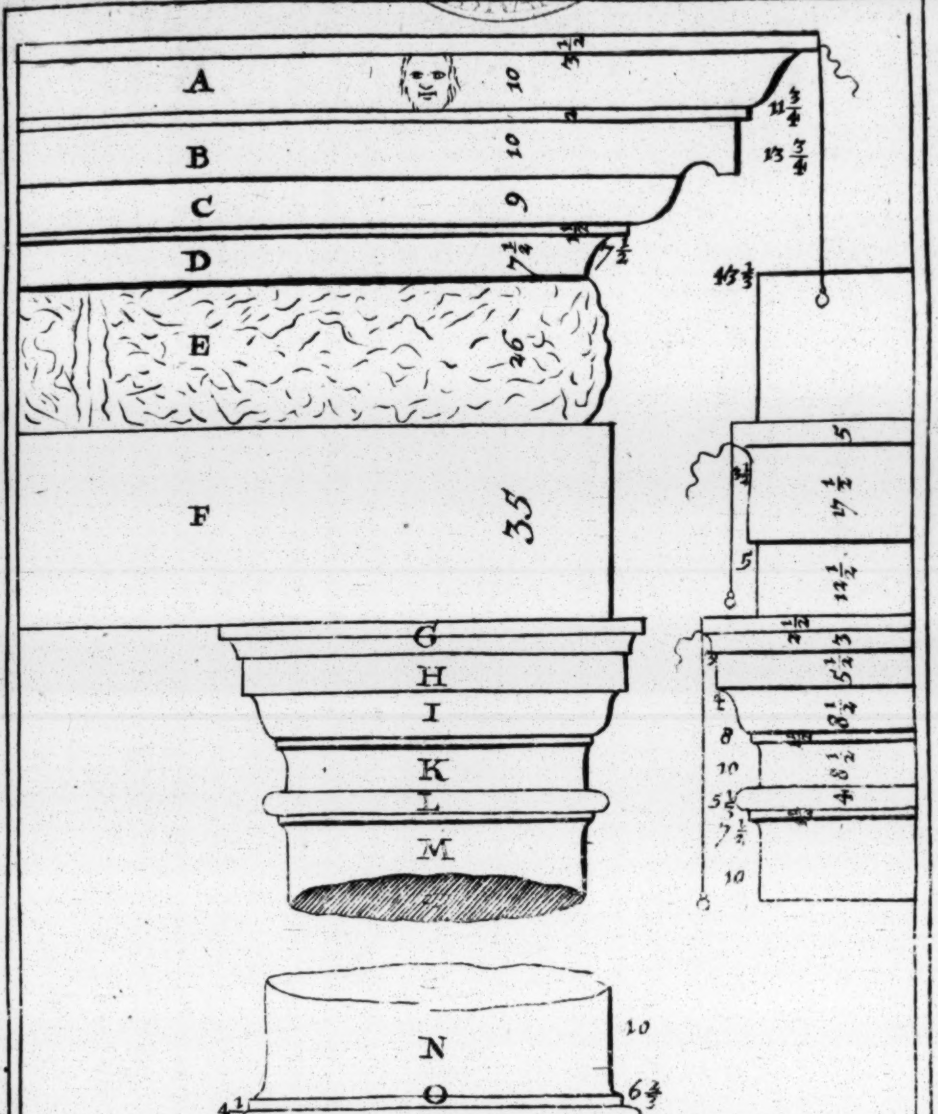

31
A
B
C
D
E
Mo. 1.
F
G
H
I
K
Mo. 1
10
8½
5½
8½
7¼
3
7½
4
11
15
16
5
10
6¼
11
2
15
1
12½

But if they make the Architraves of Stone, it muſt be obſerved, what was ſpoken before of the Inter-Columns ; there is to be ſeen ſome ancient Buildings, which may be ſaid to be built according to this Order, becauſe they retain, in part, the ſame Meaſures as in the *Arena* of *Verona*, and Threatre of *Pola*, and many others ; of which I have undertaken the Profiles, not only of the Baſe of the Capital of the Architrave of the *Frize*, and of the *Cornice*, put down in the laſt Page of this Chapter, but alſo thoſe of the Impoſts of Arches ; and of all theſe Buildings I ſhall put the Deſigns in my Books of *Antiquities*.

A	*Schima Recta.*
B	*Corona.*
C	*The Projecture of the Corona and Schima Recta.*
D	*Cavetto.*
E	*Frize.*
F	*Architrave.*
G	*Cimatium.*
H	*Abacus*
I	*Schima Recta*
K	*Hypotrachelium, or Frize of the Capital.*
L	*Aſtragalus.*
M	*Body of the Column under the Capital.*
N	*Body of the Column below.*
O	*Annulet, or Cincture.*
P	*Torus, or Schima Reverſa.*
Q	*Orlo, or Plinth of the Baſe.*

Over-againſt the *Architrave* marked F, is the Profile or Deſign of an *Architrave* very curiouſly wrought.

CHAP.

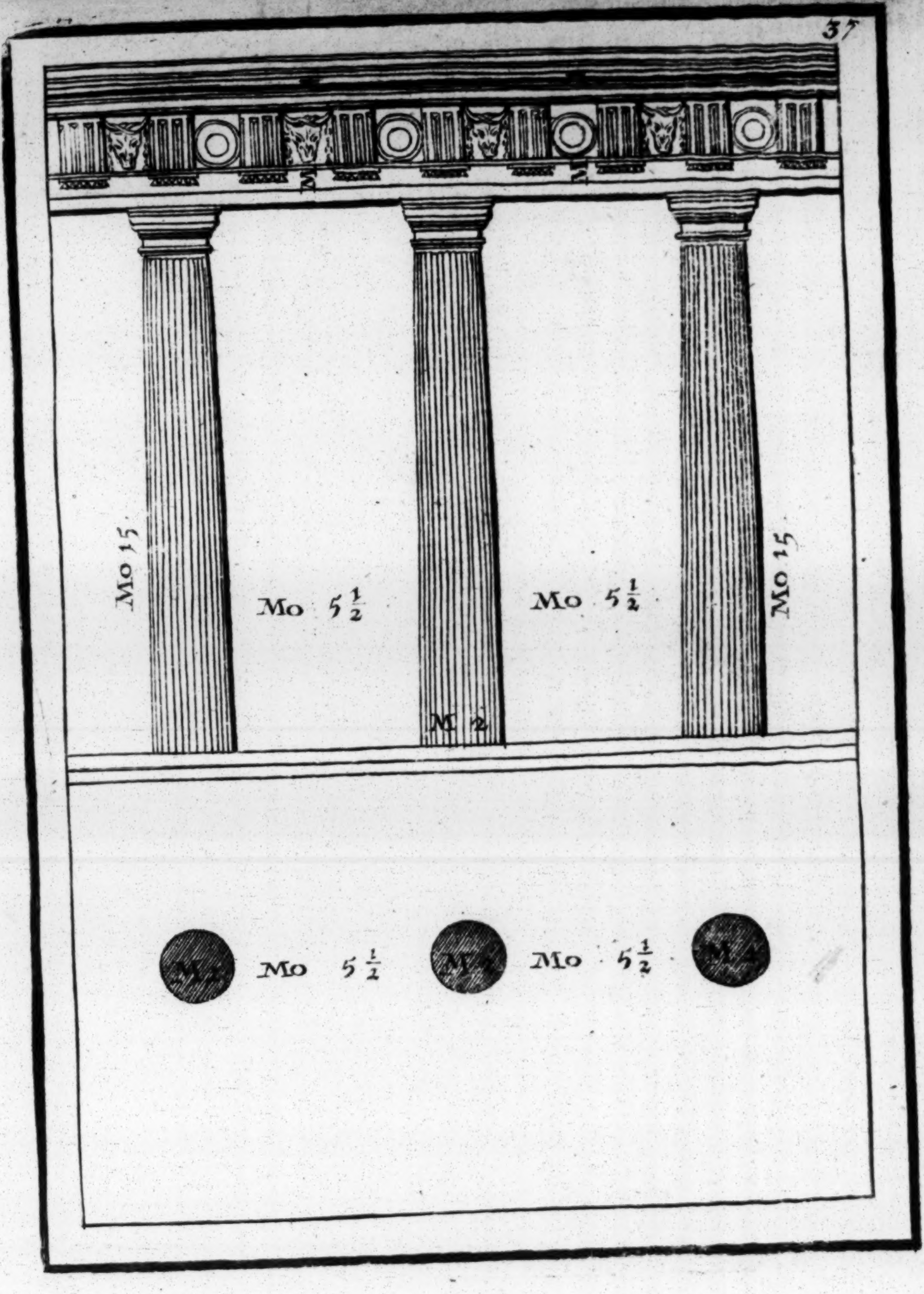

A
10
3½
11¾
B
10
13¾
C
9
D
7¼
7½
E
26
F
35
G
H
I
K
L
M
N
10
O
6¾
4½
P
Q
43⅓
5
3½
17½
5
11½
2½
3
5½
4
8½
8
10
8½
5½
4
7½
10

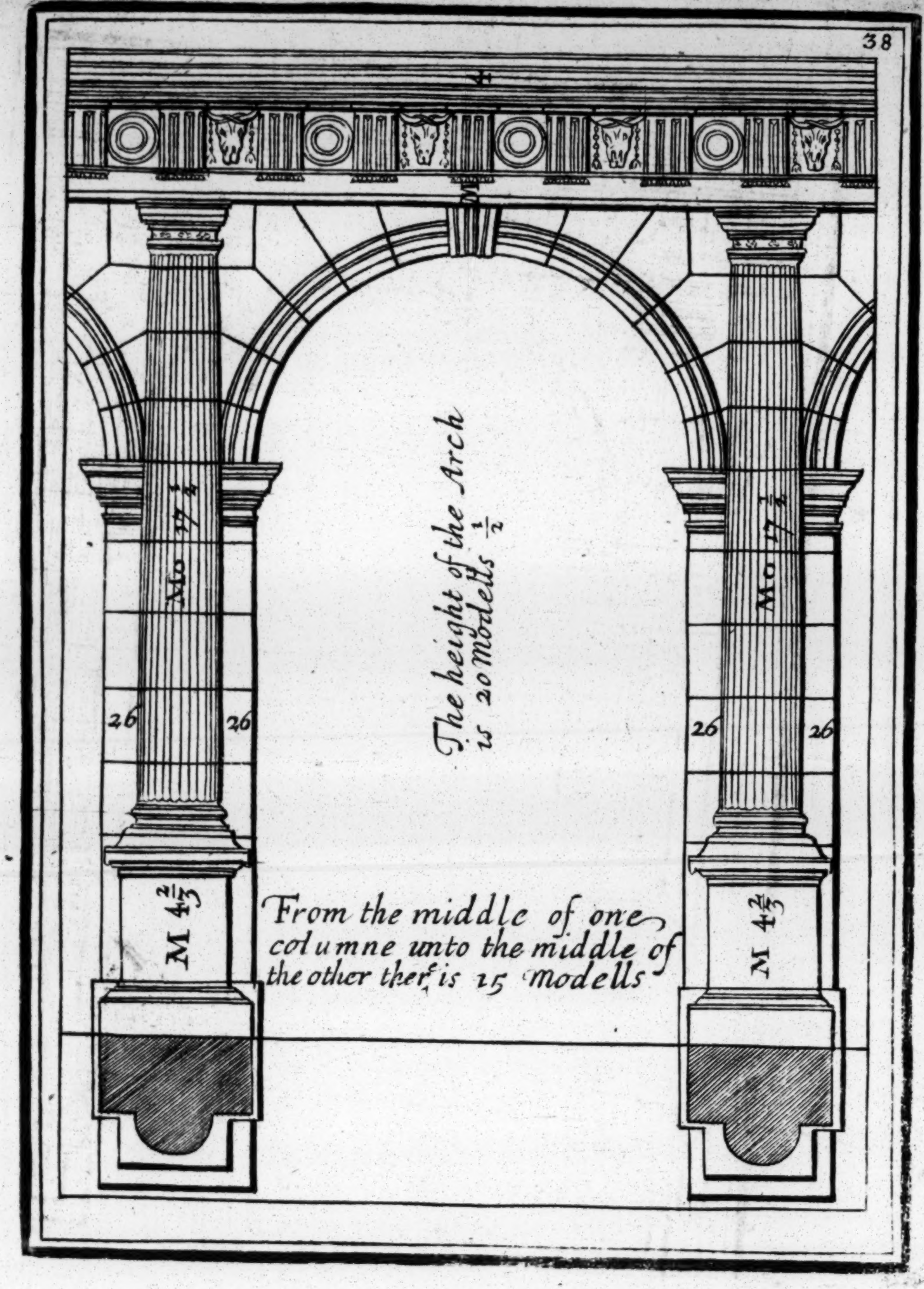
F. 2

CHAP. XV.

Of the Dorick Order.

THE *Dorick* Order had its Original and Name from the *Dorians*, a *Grecian* People which dwelt in *Aſia*; the Columns, when made alone without Pilaſters, ought to be ſeven and a half, or eight Diameters long; the Inter-Columns are little leſs than three Diameters of the Columns. And this Manner of placing Columns, by *Vitruvius* is call'd *Diaſtylos*; but if they join to Pilaſters, they muſt be, together with the Baſe and Capital, ſeventeen Models and one third in Length; and you muſt obſerve, that (as I have ſaid before in the 13th Chapter) the Model in this Order only is the half of the Diameter of the Column, divided into thirty Parts; and in all the other Orders it is the whole Diameter divided into ſixty Parts.


Mo 15
Mo 5 1/2
Mo 5 1/2
Mo 15
M 2
M 2
Mo 5 1/2
M 2
Mo 5 1/2

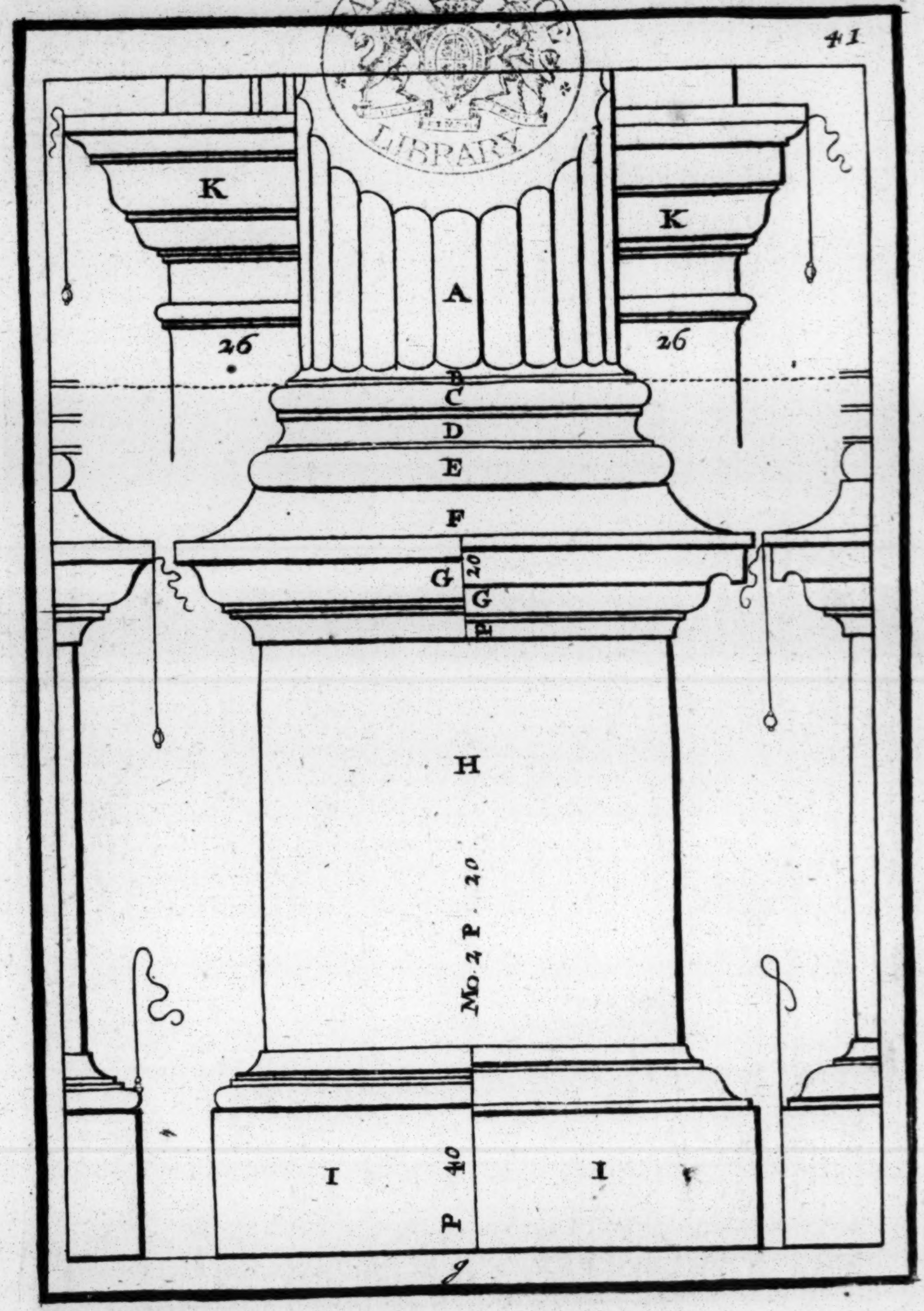

Mo 17¼
Mo 17½
26
26
26
26
M 4⅔
M 4⅔
The height of the Arch is 20 modells ½
From the middle of one columne unto the middle of the other ther is 15 modells

Amongſt ancient Buildings we ſee no *Pedeſtals* to this Order; yet they are ſeen amongſt the modern: And if you join a *Pedeſtal* to them, you muſt make the *Dado* of the *Pedeſtal* a perfect Square, and from it you muſt take the Meaſures of its Ornament; therefore it muſt be divided into four equal parts, the Baſe with its *Zocco* or *Plinth* muſt be two of them, and the *Cymatium* one, to which muſt be joined the *Orlo* or *Plinth* of the Baſe of the Column. This kind of *Pedeſtal* may alſo be ſeen in the *Corinthian* Order, as at *Verona*, in the Arch which is called *De Lioni*. I have ſet down divers Meaſures of Deſigns, which may be joined to the *Pedeſtal* of this Order, which are all very agreeable, and taken from Antiquity, and are very carefully meaſured.

This Order hath no proper Baſes; wherefore in many Buildings you may ſee Columns without Baſe, as in *Rome*, in the Theatre of *Marcellus*, in the Temple *De la Pieta* near to the ſaid Theatre, in the Theatre of *Vicenza*, and in divers other Places. But ſometimes the *Attick Baſe* is joined to them, which adds very much to their Beauty: And here is the Meaſure of it;

The height is the half Diameter of the Column, and is divided into three equal parts; one is given to the *Zocco* or *Plinth*; the other two are divided into parts: Of one is made the *Torus* ſuperiour, and the other which remains is divided into two, and one is given to the *Torus* inferiour, and the other to the *Scocia* or *Cavetto*, with its *Annulets*. Therefore if you divide it into ſix parts, of one muſt be made the *Annulet* above, and the other that below, and four muſt remain to the *Scocia*. The Projecture muſt be the ſixth part of the Diameter of the Column; the *Cincture* muſt be the half of the upper *Torus*: If it be divided from the Baſe, its Projecture muſt be the third part of the whole Projecture of the Baſe: But if the Baſe and part of the Column ſhall be one Piece, you muſt make the *Cincture* ſmall, as you may ſee in the third Deſign of this Order, where alſo are two Manners of *Impoſts* of Arches.

A	*Body of the Column.*	
B	*Annulet, or Cincture.*	
C	*The upper Torus.*	
D	*Scocia, with its Annulets.*	
E	*The lower Torus.*	
F	*Plinth, or Zocco.*	
G	*Cymatium*	
H	*Dodo, or Square*	*of the Pedeſtal.*
I	*Baſe*	
K	*Impoſts of Arches.*	


K
K
A
26
26
B
C
D
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F
G
20
G
P
H
Mo. 2 P. 20
I
I
P 40
9

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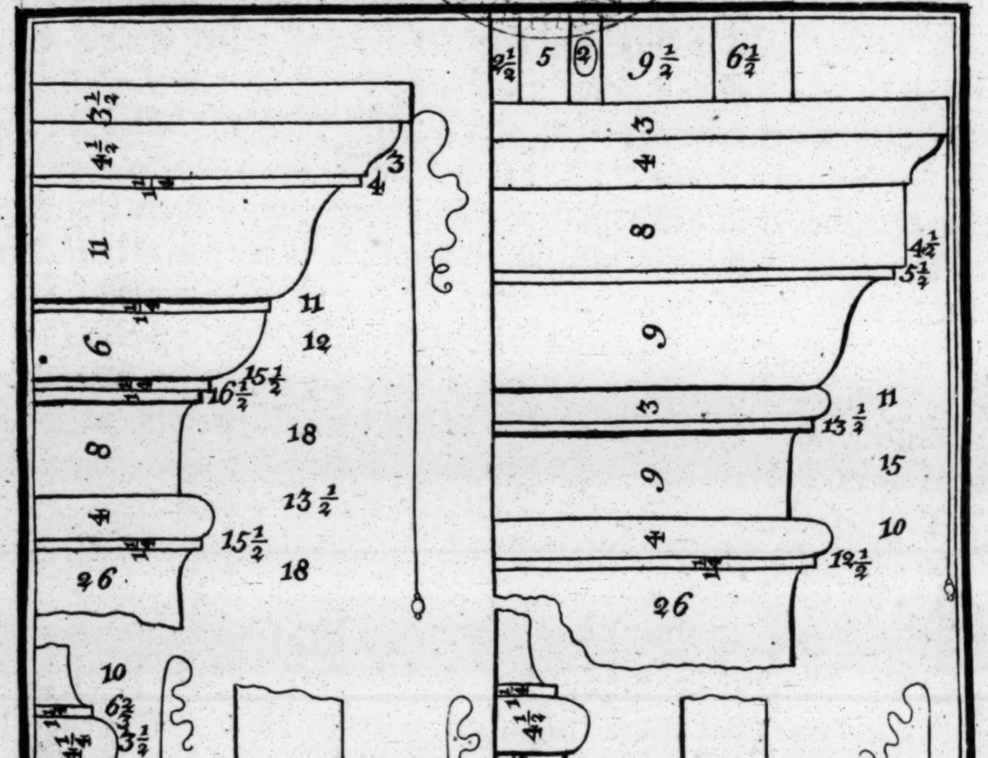


C. 2.

The Height of the Capital ought to be the half Diameter of the Column below, and is divided into three parts; that above ſhall be divided into five parts; three ſhall be for the *Abacus*, and the other two parts for the *Cymatium*, the which muſt be ſubdivided into three parts; of one is made the *Liſtella*, or *Annulet*, and of the other two, the *Schima Recta*. The ſecond part is divided into three equal parts; one is given to the *Annulet*, which are three, and are equal; the other two which remain, to the *Ovolo* or *Echinus*, whoſe Projecture is two thirds of its Height. The third principal part of the ſaid Capital is for the *Hypotrachelium* or *Frize* of the Capital given to the *Collarino*; the whole Projecture is the fifth part of the Diameter of the Column. The *Aſtragal* is as high as all the three *Annulets*, and is in Projecture equal to the Body of the Column below. The *Annulet* or *Cincture* is half the Height of the *Aſtragal*; the Projecture thereof is plumb with the Centre of the ſaid *Aſtragal*.

Upon the Capital is made the *Architrave*, which is to be in Height half the Thickneſs of the Column, that is to ſay, one Model; it is divided into ſeven; of one is made the *Tenia*, whoſe Projecture muſt be equal to its Height. The whole is divided into ſix parts, one whereof is given to the *Guttæ*, the which ought to be ſix in number, and to the *Liſtella* which is under the *Tenia*, which is a third of the ſaid *Guttæ*. The reſt is divided into ſeven parts, from the *Tenia* downwards, three whereof is given to the firſt *Faſcia*, and four to the ſecond. The *Frize* is in height a Model and a half; the breadth of the *Trigliph* is one Model, and its Capital is the ſixth part of a Model. The *Trigliph* is divided into ſix parts, two whereof is given to the two Channels in the middle, and one to the half Channels at the Extremities, and the other three make the Spaces that are below the ſaid Channel. The *Metopa*, that is to ſay, the Space between two *Trigliphs*, ought to be as broad as high.

The *Cornice* ought to be in height one Model and a ſixth part, and is divided into five parts and a half; two whereof is given to the *Cavetto* and *Ovolo*; the *Cavetto* is leſs than the

the *Ovolo*, as much as is the *Liſtella*; the other three and half is given to the *Corona*, and for the *Schima Reverſa*, and *Schima Recta*.

The *Corona* ought to have in Projecture four-ſix parts of the Model; and on its Plain, which looketh downwards, and projecteth forth, muſt have in length ſix *Guttæ*, and three in breadth, over the *Trigliphs* with their Liſts, and over the *Metopa* certain Roſes.

The *Guttæ* or Bells, anſwer to thoſe which are under the *Tenia*, which are made in Form like a Bell.

The *Cymatium* muſt be an eighth part thicker than the *Corona*, and is divided into eight parts, two whereof is given to the *Orlo* or *Liſtella*, and ſix remain to the *Cymatia*, whoſe Projecture is ſeven parts and a half; whereupon the *Architrave*, the *Frize*, and the *Cornice* fall out to be in height the fourth part of the length of the Column: And theſe are the Meaſures of the *Cornice*, according to *Vitruvius*, from whom I have a little ſwerved, altering the Members, and making them a little bigger.

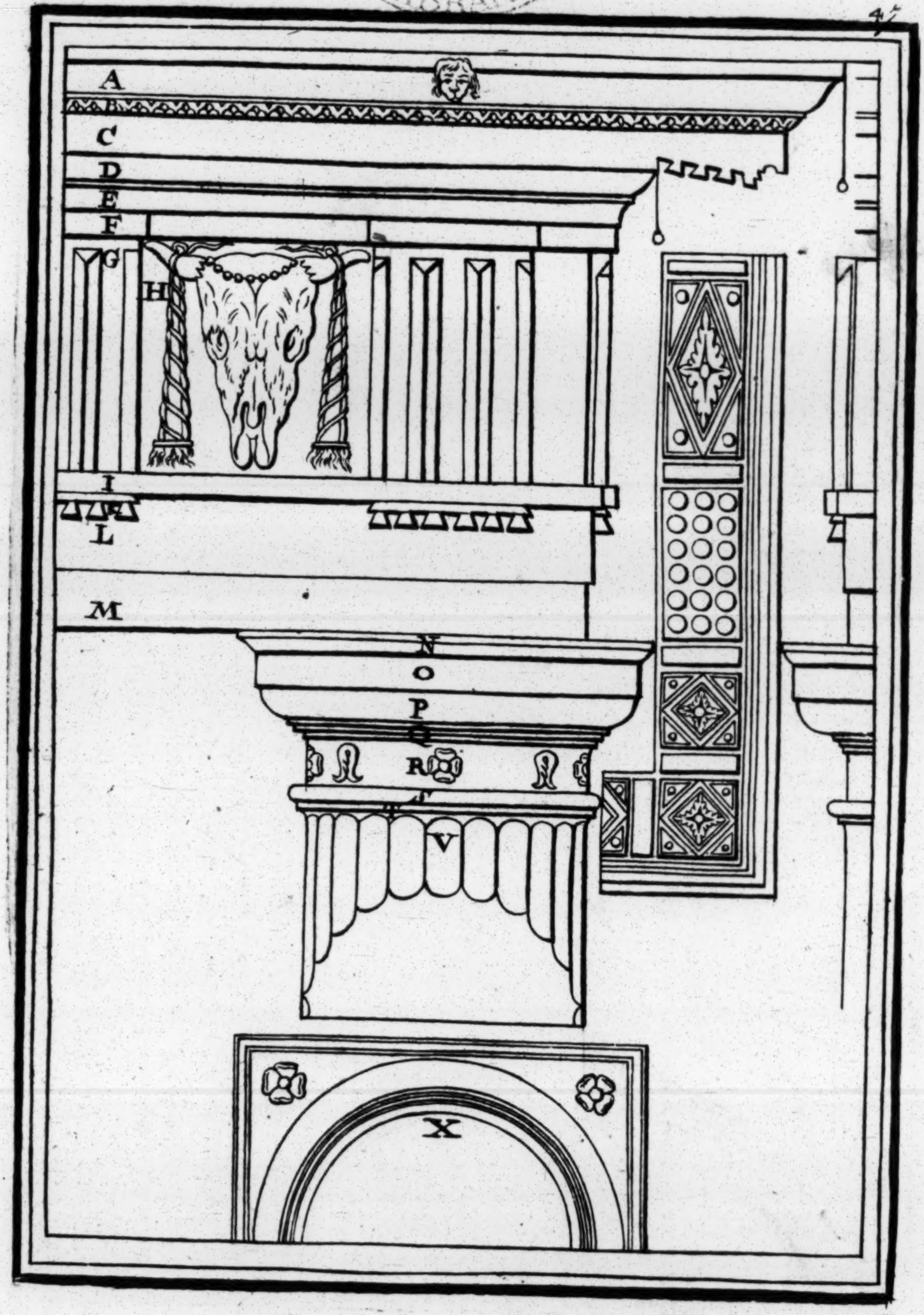
A *Schima*

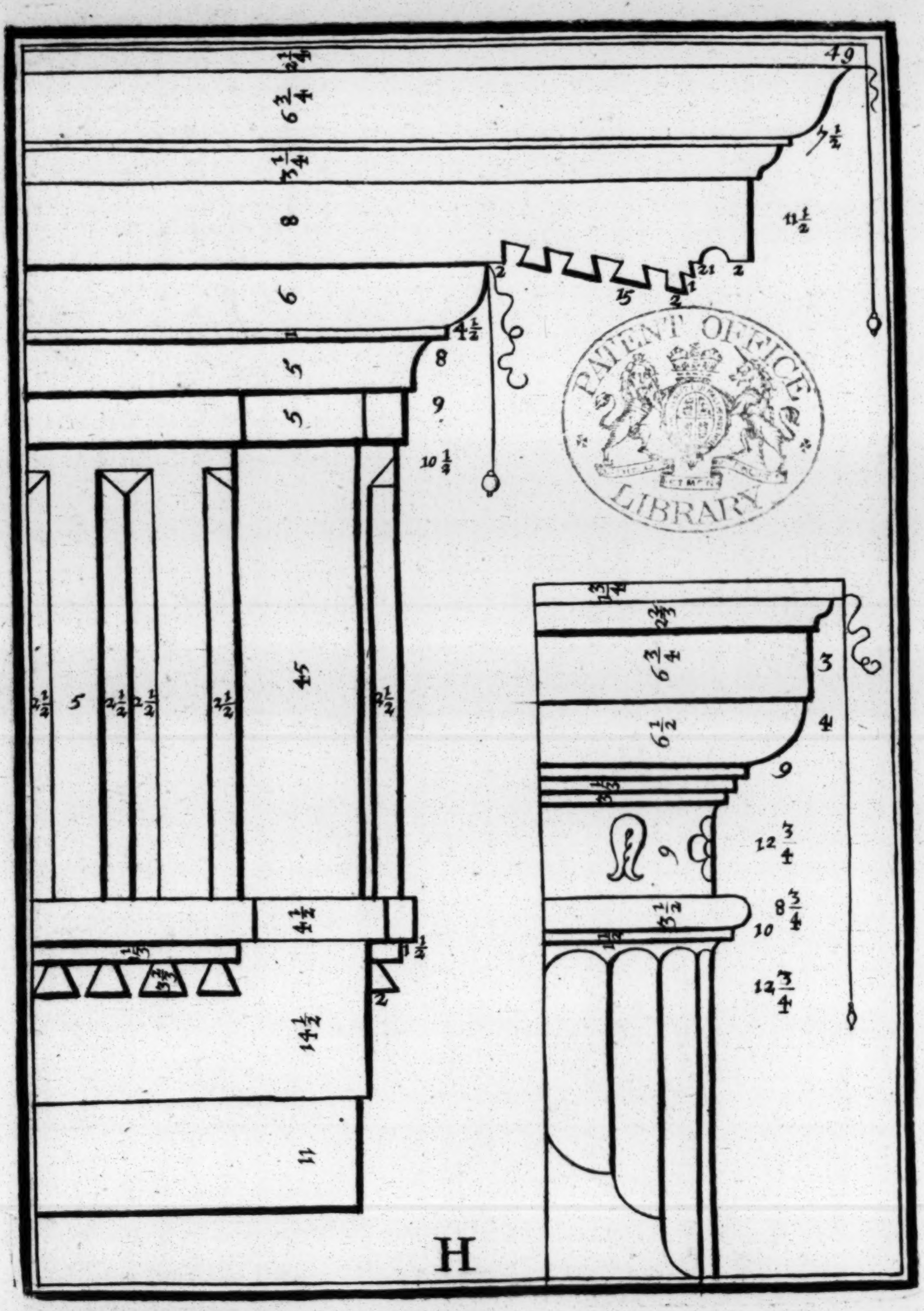
A	*Schima Recta.*
B	*Schima Reverſa.*
C	*Corona.*
D	*Ovolo.*
E	*Cavetto.*
F	*The Capitals of the Trigliph.*
H	*Trigliph.*
I	*Tenia.*
K	*Guttæ.*
L	*Prima Faſcia.*
M	*Secunda Faſcia.*

Parts of the Capital.

N	*Cymatium.*
O	*Abacus.*
P	*Ovolo*, or *Echinus.*
Q	*Annulets.*
R	*Hypotrachelium, or Frize.*
S	*Aſtragal.*
T	*Liſtella, or Cincture.*
G	*Body of the Column.*
X	*The Plain of the Capital, and Model, divided into thirty parts.*
Y	*The Under-part of the Corona.*

47





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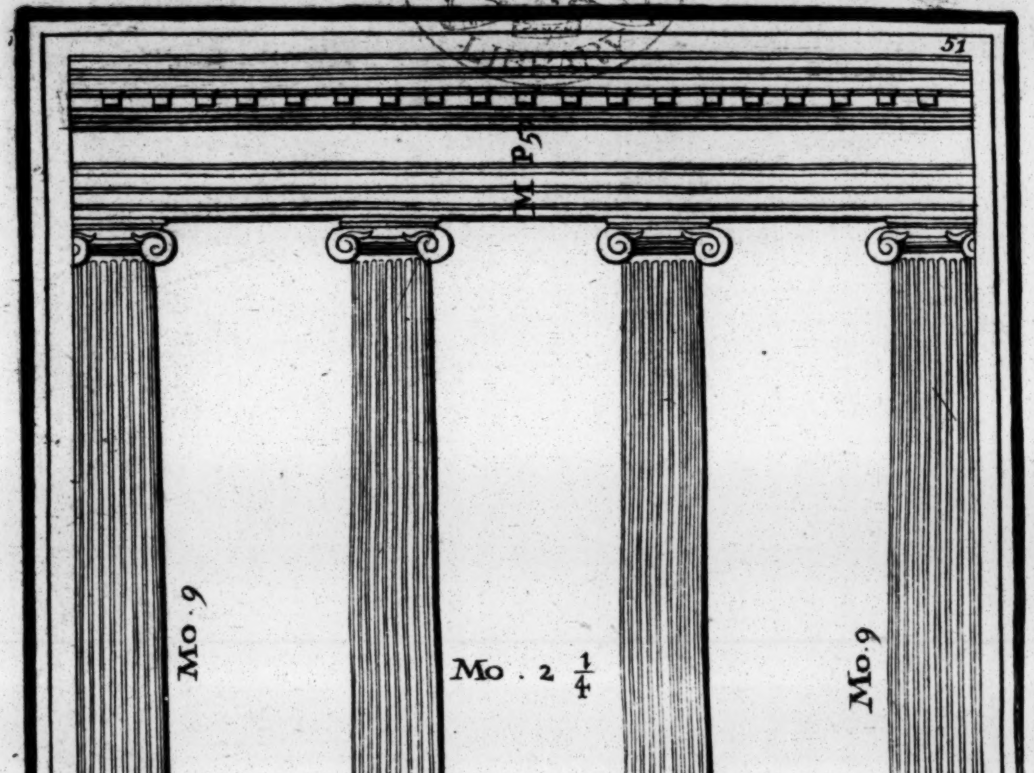
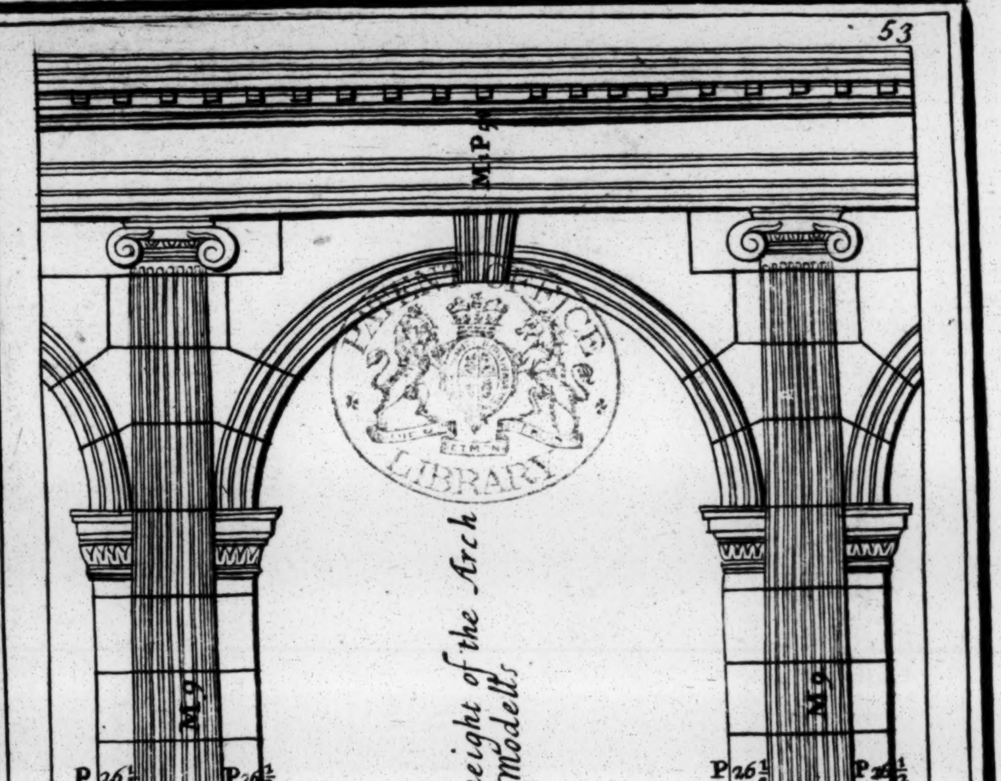
CHAP. XVI.

Of the Ionick *Order.*

THE *Ionick* Order had its Original in *Ionia*, a Province in *Aſia*; and we read, that the Temple of *Diana* at *Epheſus* was Built of this Order: The Columns, with Capital and Baſe, are Nine Models Long; and by a Model, is underſtood the Diameter of the Column below. The Architrave, Frize, and Cornice are the fifth Part of the Height of the Column, in the following Deſign, which is of Columns alone; the Inter-Columns are of two Diameters and a fourth Part. And this is the faireſt and moſt commodious Manner of Inter-Columns, and by *Vitruvius* is call'd *Euſtillos*. In the other Deſign, which is of Arches, the Pilaſters are in Breadth a third Part of the Height of the Arch, and the Arches are in Height two Squares.


M P5
Mo. 9
Mo . 2 $\frac{1}{4}$
Mo. 9
M 1
M 1
M 1
Mo. 2 $\frac{1}{4}$
M 1
Mo. 2 $\frac{1}{4}$
M 1
Mo. 2 $\frac{1}{4}$
M 1



The height of the Arch is 11 Modells

From the middle of one columne to the middle of the other ther is 7 Modells and 17 parts

If you put a *Pedeſtal* to the Column of the *Ionick* Order, as in the Deſign of the Arches, it muſt be made as High as half the Breadth of the Light of the Arch, and muſt be divided into ſeven Parts and a half; of two of them ſhall be made the Baſe of one; the *Cymatium* and a half, which remains, ſhall be for the *Dado*, or Square of the *Pedeſtal.*

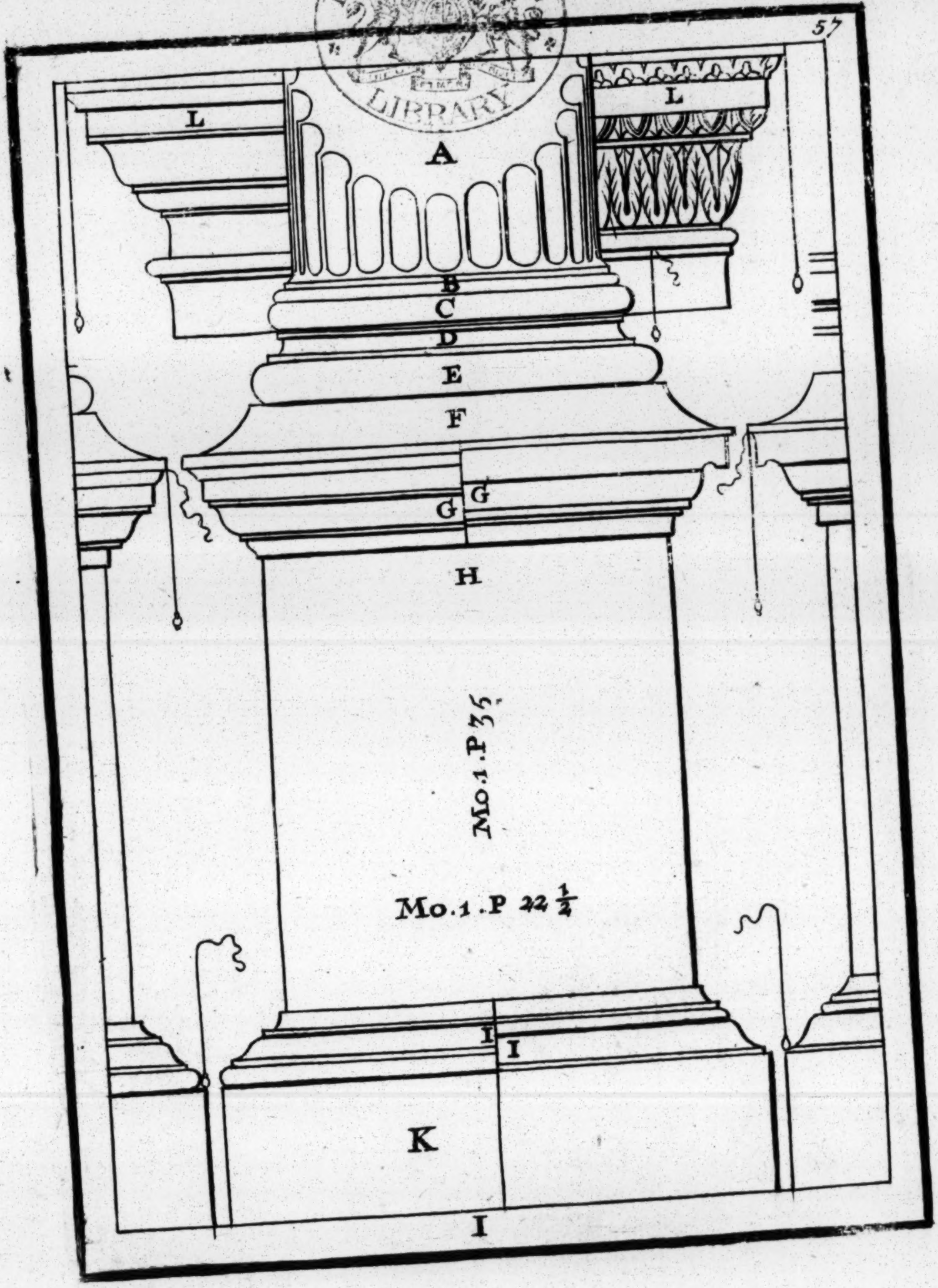
The Baſe of this Order is in Thickneſs half a Model, and is divided into three Parts; one is for the *Plinth*; its Projecture is the fourth Part of the ſaid Thickneſs, and conſequently the eighth Part of a Model. The other two Parts of the Baſe are divided into ſeven; of three is made the *Upper Torus*; the other four are divided again into two Parts, one is given to the *Scocia* above, and the other to that below, which ought to have more Projecture than the other.

The *Aſtragals* ought to have the eighth Part of the *Scocia*; the *Cincture* of the Column is the third Part of the *Torus* of the Baſe: But if it be ſo that you make the Baſe join with part of the Column, you muſt make the *Cincture* ſmall, (as I have alſo ſaid in the *Dorick* Order;) the *Cincture* hath in Projecture half the Projecture aforeſaid. Theſe be the Meaſures of the *Ionick* Baſe, according to *Vitruvius.*

But becauſe in many Antique Buildings are ſeen to this Order *Attick* Baſes, and to me ſeems more agreeable upon the *Pedeſtal*, I have deſigned the *Attick* Baſe with a ſmall *Torus* or *Aſtragal* under the *Cincture*; not omitting therefore to make the Deſign thereof as *Vitruvius* teacheth us.

The Deſigns *L* are two different Profiles for to make the Imposts of Arches; and of each there are ſet down the Meaſures by Numbers, which ſhew the Part of a Model, as is done in all the other Deſigns; theſe *Imposts* are in Height half as much again as the Thickneſs of the *Pilaſter* which ſupports the Arch.

A	*Body of the Column.*	
B	*The Aſtragal, with the Cincture, which are Members of the Column.*	
C	*Upper Torus.*	
D	*The Hollow, called Scocia.*	
E	*The Lower Torus.*	
F	*The Plinth faſten'd to the Cymatium of the Pedeſtal.*	
G	*Cymatium in two Forms*	
H	*Dado, or Plain Square*	*of the Pedeſtal.*
I	*Baſe in two Forms*	
K	*Orlo, or Plinth.*	
L	*Impoſts for the Arches.*	


L
L
A
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C
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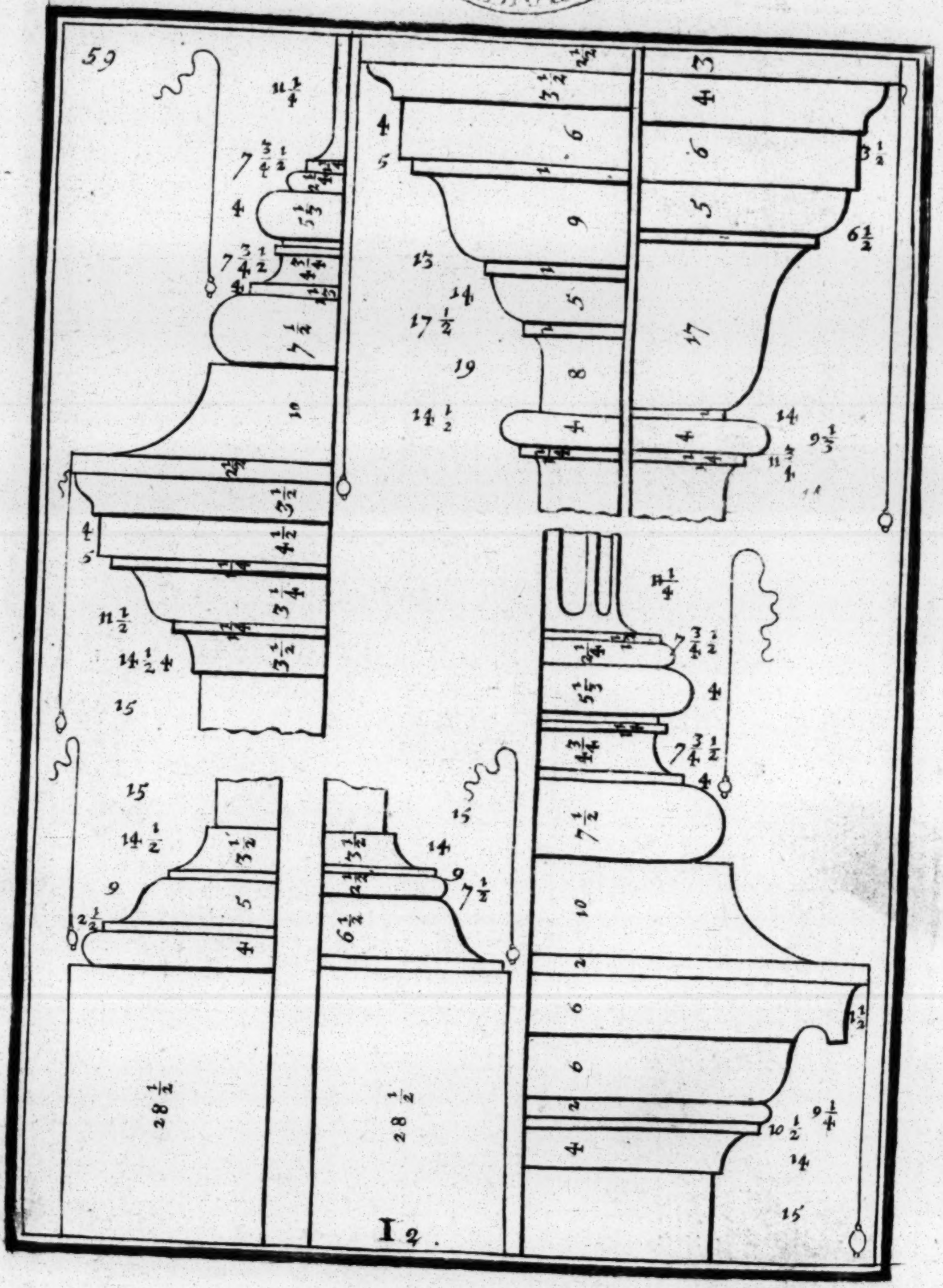
Mo.1.P 35
Mo.1.P 22 1/4
I
I
K
I


59
11 1/4
7 3/4 1/2
4
5 1/3
7 3/4 1/2
7 1/2
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3 1/4
11 1/2
14 1/2 4
15
4
5
3 1/2
6
9
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13
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17 1/2
19
14 1/2
4
14
9 1/3
11 3/4
6 1/2
4 3
3 1/2
11 1/4
7 3/4 1/2
4
5 1/3
7 3/4 1/2
7 1/2
10
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9
7 1/2
6 1/2
28 1/2
28 1/2
I 2

To make the *Capital*, the Foot of the Column muſt be divided into eighteen Parts, and nineteen of ſuch Parts is the Breadth and Length of the *Abacus*, and the half is the Height of the *Capital* with the *Voluta*; whereupon it becomes to be nine Parts and a half high: One and a half is for the *Abacus*, with its *Cymatium*; the other eight remains to the *Voluta*, which is made in this Manner: From the Extremity of the *Cymatium* within is placed one of the nineteen Parts; and from the Point which is there made is let fall a Line-Plumb, which divides the *Voluta* in the middle, and is call'd *Catheta*; and where the Point falls in this Line which ſeparates the four Parts and half above, and the three and half below, there is made the Centre of the Eye of the *Voluta*, whoſe Diameter is one of the eight Parts; and from the ſaid Point is drawn a Line which interſects at Right Angles. The *Catheta* divides the *Voluta* into four Parts, in the Eye of which is formed a Square, the bigneſs whereof is the half Diameter of the ſaid Eye. The *Diagonal* Lines being drawn in it, in them are made the Points whereon the fixed Foot of the *Compaſs* is to ſtand to make the *Voluta*, and they are (computing the Centre of the Eye) thirteen Centres; as to the Order which muſt be obſerved in them, it appears by the Number placed in the Deſign. The *Aſtragal* of the Column is right againſt the Eye of the *Voluta*; the *Volutes* are as thick in the Middle as is the *Projecture* of the *Ovolo* or *Echinus*, which reacheth beyond the *Abacus* ſo much as is the Eye of the *Voluta*; the Hollow of the *Voluta* is even with the Body of the Column. The *Aſtragal* of the Column turns about under the *Voluta*, and is always ſeen, as appears in the Platform of the Column; and 'tis natural, that ſo ſlender a thing as is the *Voluta* ſhould give way to one ſo hard as is the *Aſtragal*; and the *Voluta* is always equally diſtant from it.

They were wont to make in the Angles of Rows of Columns, or Proches of the *Ionick* Order, *Capitals*, which had the *Voluta* not only in the Front, but alſo in that Part, that making the *Capital* as they were wont to do, would be the Flank; whereupon they come to have the Front on two Sides, and are called *Angular Capitals*: And how they made them, I ſhall demonſtrate in my Book *of Temples*.

A *Abacus*

A	*Abacus.*
B	*Hollows of the Voluta.*
C	*Ovolo, or Echinus.*
D	*Aſtragal under the Echinus.*
E	*Cincture, or Annulet.*
F	*Body of the Column.*
G	*Line call'd Catheta.*

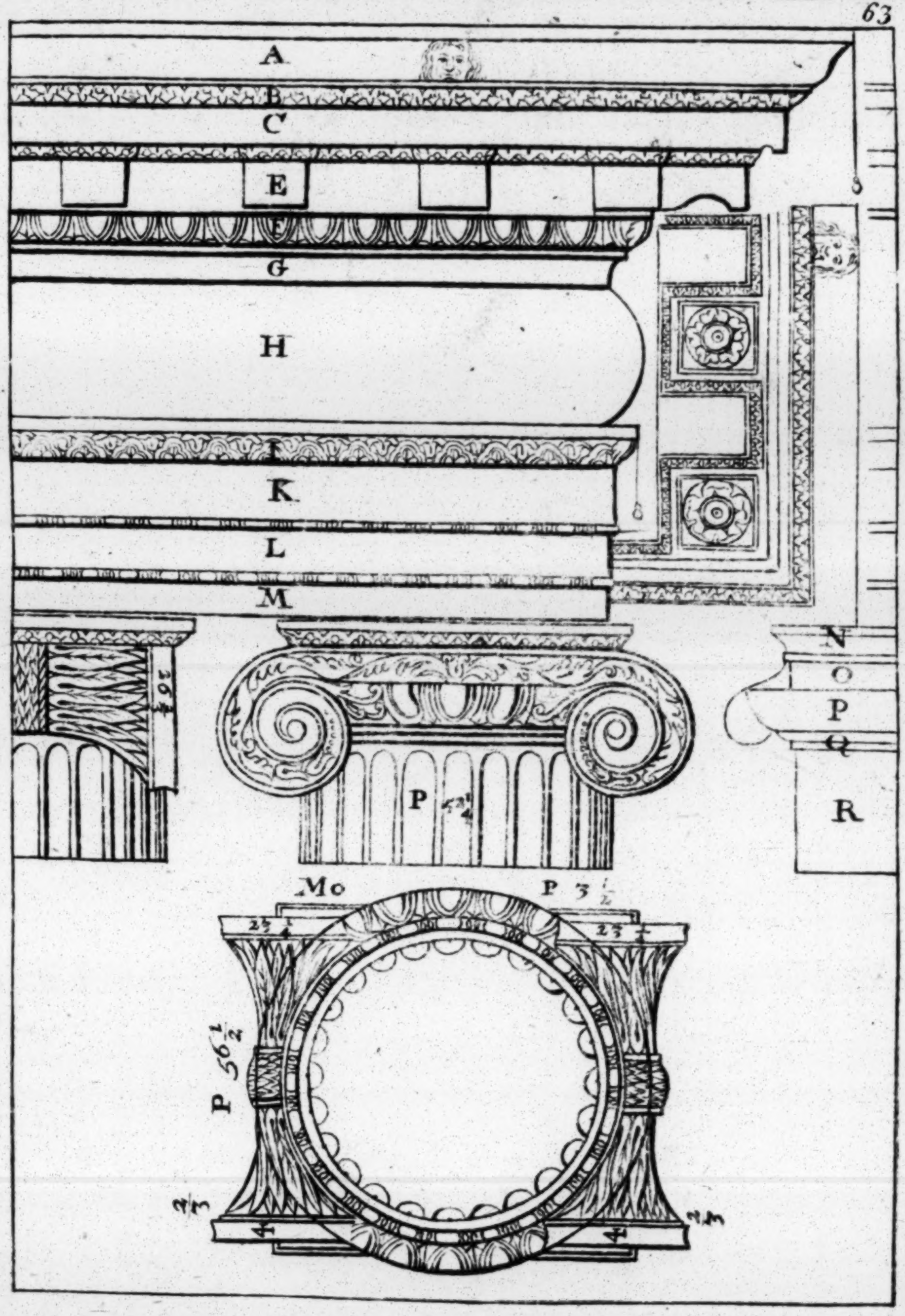
On the Platform of the Capital of the Column the ſaid Members are marked with the ſame Letters.

S	*The Eye of the Voluta in a large Form.*

Members of the Baſe, according to Vitruvius.

K	*Body of the Columns.*
L	*Cincture, or Annulet.*
M	*Torus.*
N	*Scocia prima.*
O	*Tondino, or Aſtragal.*
P	*Scocia ſecunda.*
Q	*Orlo, or Plinth.*
R	*Projecture of the Baſe.*

The


A
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23½
P 56½
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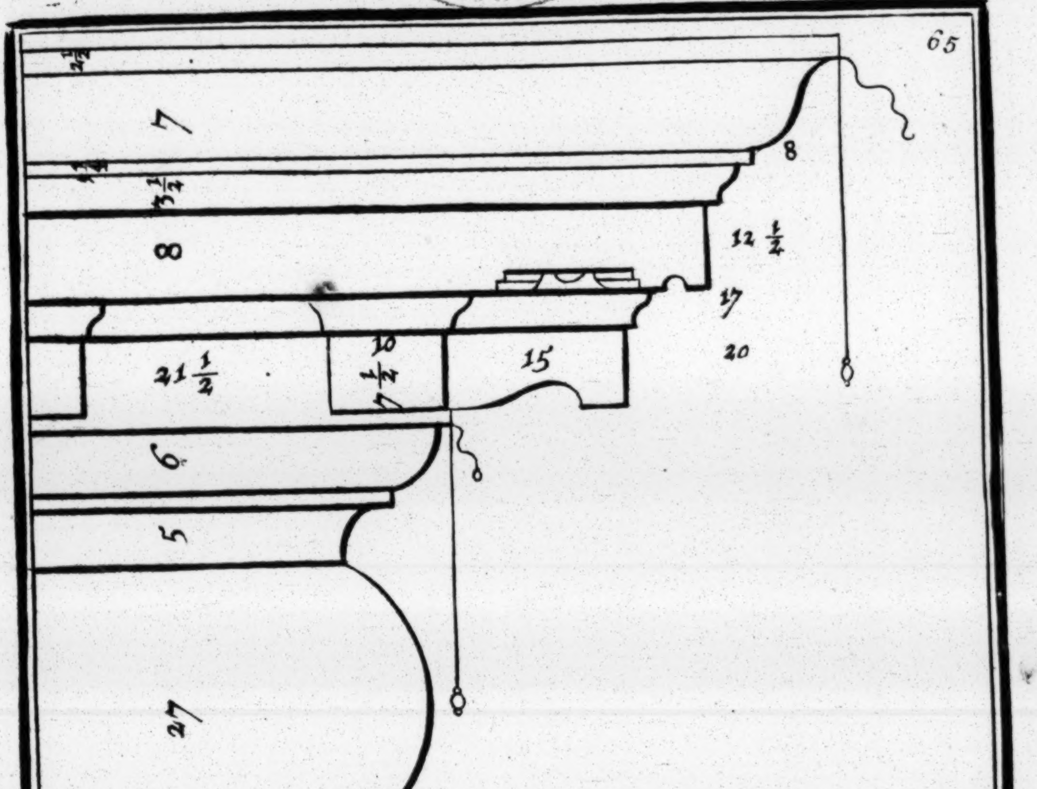
4
4
⅔


2½
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4¾
10½
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7½
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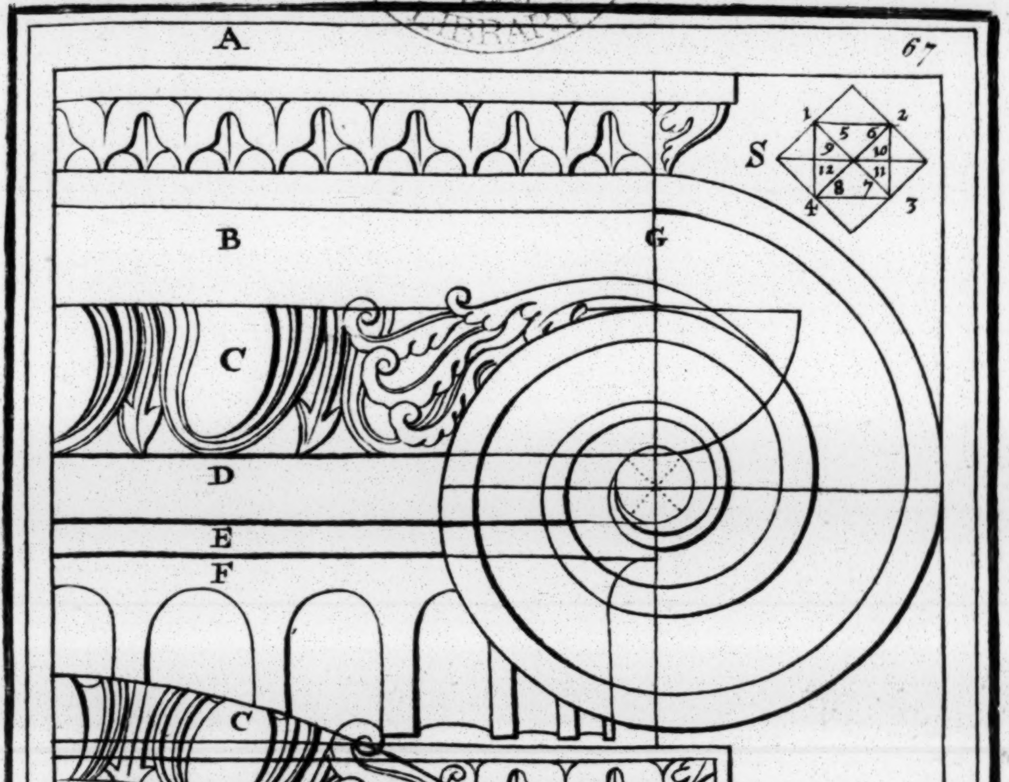
1⅓
6½

K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K 2

The *Architrave*, *Frize*, and *Cornice*, make (as I have ſaid) the fifth Part of the Height of the Column; and the Whole is divided into twelve Parts, the *Architrave* four, the *Frize* three, and the *Cornice* five: The *Architrave* is divided into five Parts, of one is made the *Cymatium*, and the reſt are divided into twelve; three are given to the firſt *Faſcia* and its *Aſtragal*, four to the ſecond and its *Aſtragal*, and five to the third.

The *Cornice* is divided into ſeven Parts ¾; two are given to the *Scocia* and *Ovolo*, two to the *Modilions*, and the ¾ to the *Corona* and *Schima Recta*, and projecteth forwards as much as its Thickneſs.

I have deſigned the Front, the Flank, and the Platform of the *Capital*, the *Architrave*, *Frize*, and *Cornice*, with their convenient Sculptures.

A *Schima Recta.*

B *Schima Reverſa.*

C *Corona.*

D *Cymatium of the Modilions.*

E *Modilions.*

F *Ovolo.*

G *Cavetto.*

H *Frize.*

I *Cymatium of the Architrave.*

KLM *are the firſt, ſecond, and third Faſcia.*

Members of the Capital.

N *Abacus.*

O *Hollows of the Voluta.*

P *Ovolo, or Echinus.*

Q *Aſtragal of the Column.*

R *Body of the Column.*

CHAP

CHAP. XVII.

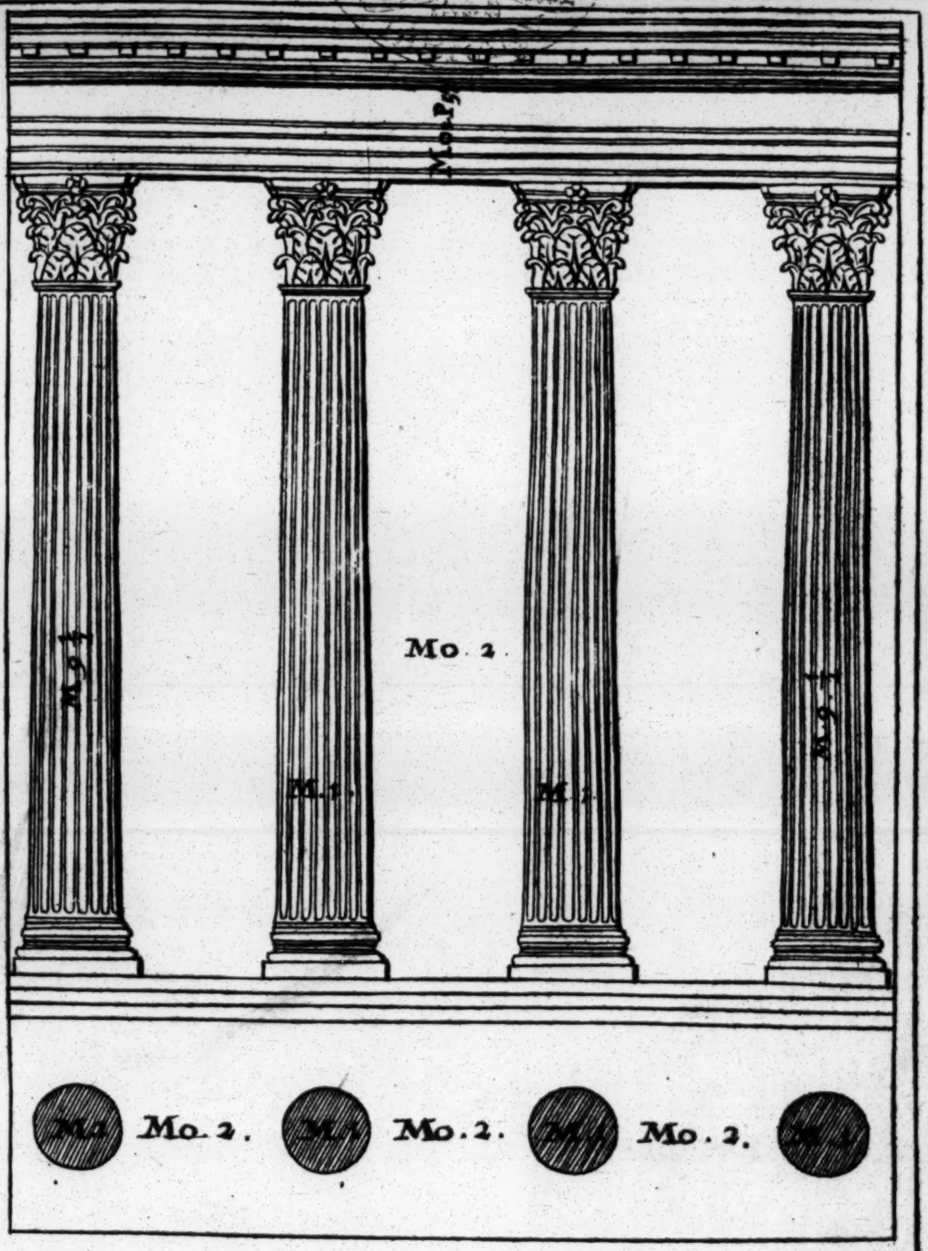
Of the Corinthian *Order.*

AT *Corinth*, a noble City of *Peloponneſe*, or *Morea*, firſt of all was found the Order which is call'd *Corinthian*, which is more Adorned and Beautified than any I have yet treated on.

The Columns are like the *Ionick*, and with the Baſe and Capital joined to them, they are nine Models and a half long. If you make them Fluted, they muſt have 24 Flutes or Channels, which muſt be made half ſo Deep as Broad: The Plains or Spaces between one Flute and the other muſt be a third Part of the Breadth of the ſaid Flutes. The Architrave, Frize, and Cornice are a fifth Part of the Height of the Column; in the Deſign of Columns alone, the Inter-Columns are two Diameters, as is the Portal of St. *Maria Rotunda* in *Rome*; and this Form of Rows of Pillars, is by *Vitruvius* call'd *Syſtylos*. And in that of Arches, the Pilaſters are of two Parts of five of the Light of the Arch; and the Light of the Arch is in Height two Squares and a half, the Thickneſs of the firſt Arch being comprehended.

The *Pedeſtal* under the *Corinthian* Column muſt be in Height a fourth Part of the Length of the Column; and being divided into eight Parts, one is given to the *Cimatium*, two to its *Baſe*, and five remains to the *Dado* or Plane of the *Pedeſtal*; the *Baſe* muſt be divided into three Parts, two for the *Zocco* or *Plinth*, and one to the *Cornice*.

The *Baſe* of the Column is the *Attick*, but in this Order it differs from that which is put to the *Dorick* Order: In this the *Projecture* is the fifth Part of the Diameter of the Column; whereas in the *Dorick* it is the ſixth Part; it may alſo vary in ſome other Parts, as may be ſeen in the Deſign, where alſo is ſet down the *Impoſts* of the Arches, the which is in Height one half more than the Thickneſs of the *Membretto*, that is to ſay, the *Pilaſter* which bears up the Arch.



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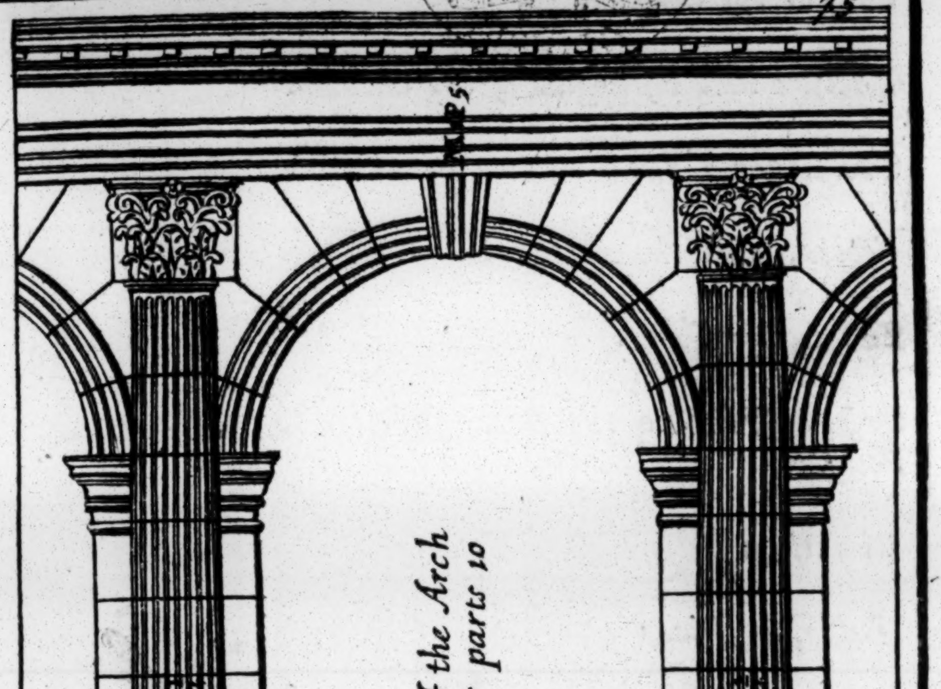


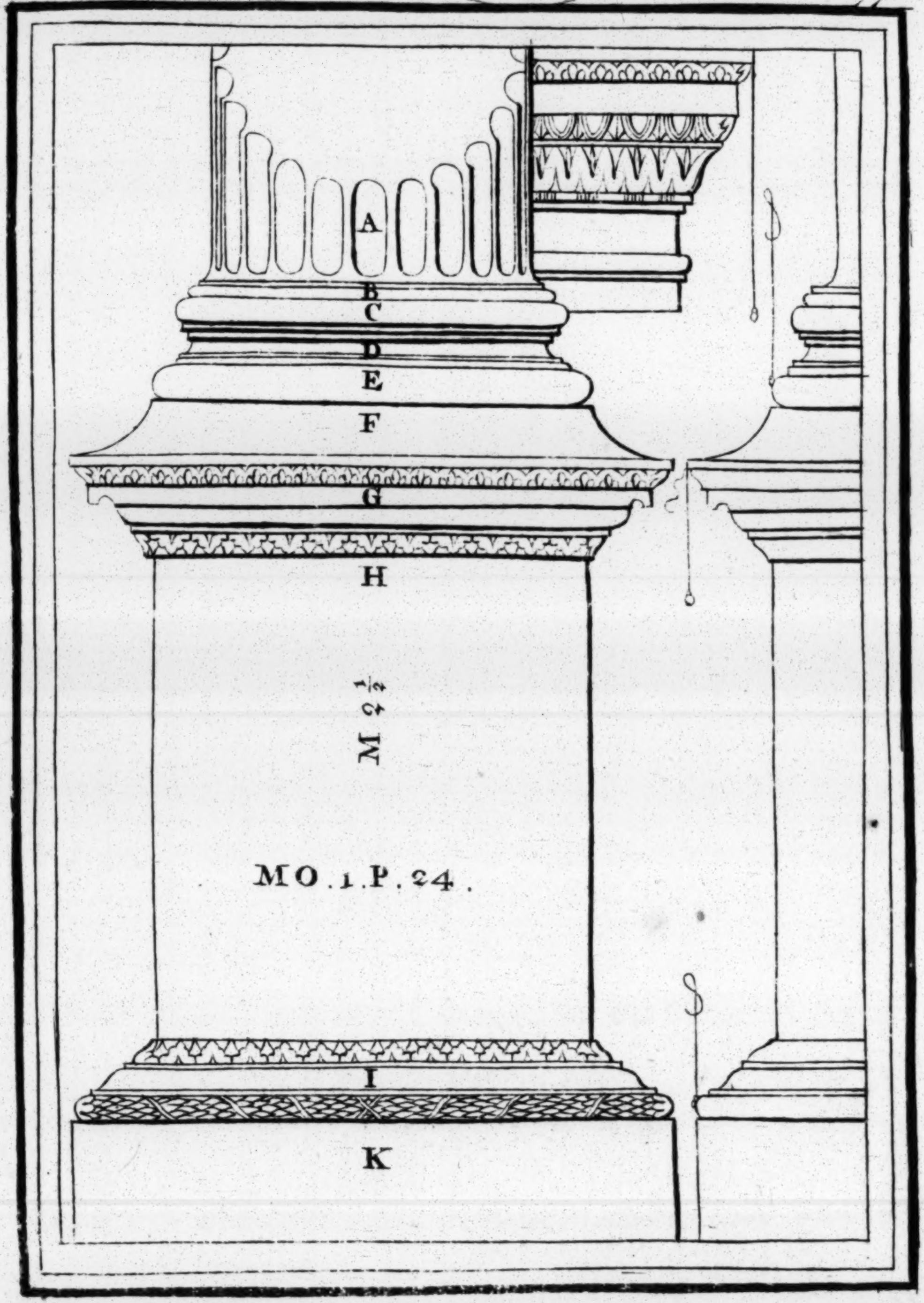
The height of the Arch is 11 Modells parts 10

From the middle of one Columne to the middle of the other ther is 6 Modells ½

A	*Body of the Column.*	
B	*Cincture and Aſtragals of the Column.*	
C	*The Upper Torus.*	
D	*Scocia, with the Aſtragals.*	
E	*The Lower Torus.*	
F	*Orlo, or Plinth of the Baſe, faſten'd to the Cymatium of the Pedeſtal.*	
G	*Cimatium*	*of the Pedeſtal.*
H	*Dado, or Plain*	
I	*Gorona of the Baſe*	
K	*Orlo, or Plinth of the Baſe.*	

The Impoſts of the Arch is at the Side of the Column.

The *Corinthian* Capital ought to be as high as the thickneſs of the Column below, and a ſixth Part more, which is allowed to the *Abacus*; the reſt is divided into three equal Parts, the firſt is given to the firſt Leaf, the ſecond to the ſecond; and the third is divided again into two, and of that Part next the *Abacus* is made the *Caulicoli*, with the Leaves, which ſeem to ſupport them whence they grow; and therefore the Stalk from whence they grow muſt be made thick, and in their Foldings muſt diminiſh by little and little: The Example hereof is taken from Plants which are bigger at the Root than at the extremity of the Branches. The Bell, which is the Body of the *Capital* under the Leaves, ought to be direct to the Bottoms of the Flutes of the Column.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B
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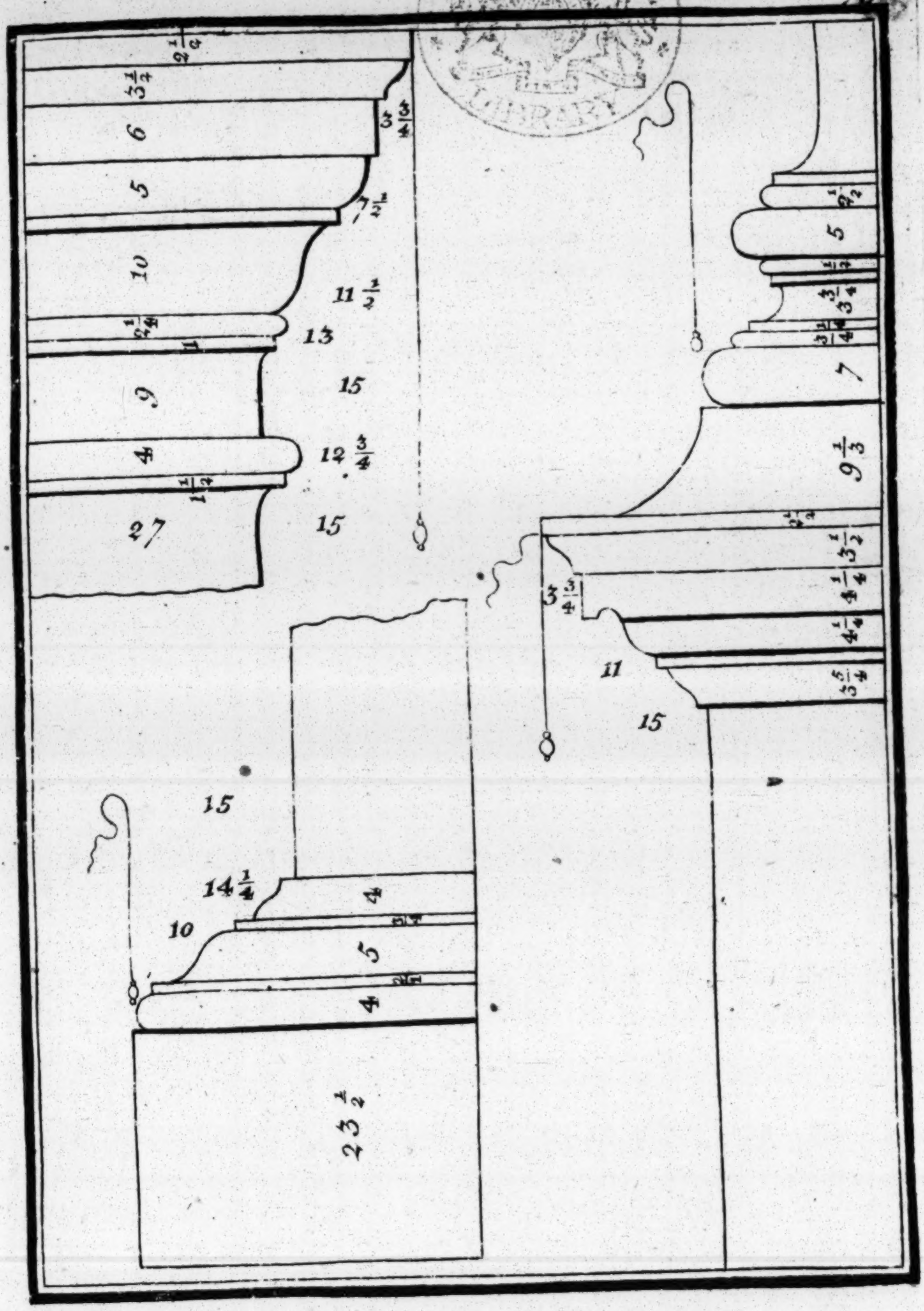
M 2½
MO.1.P.24.
I
K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3 3/4
4 1/4
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11
15
15
14 1/4
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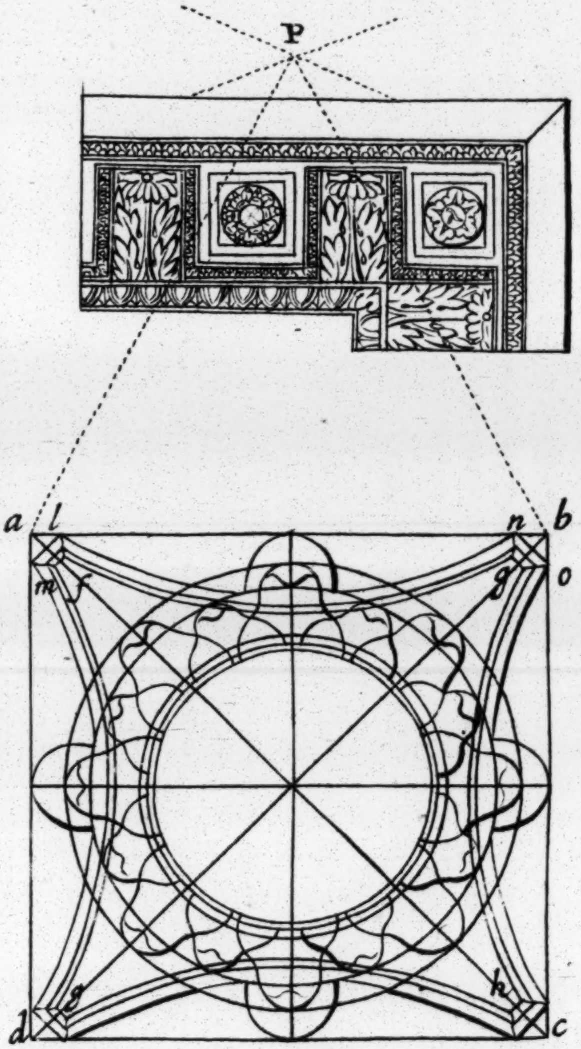
2 1/4
4
23 1/2

To make the *Abacus*; that it may have a convenient *Projecture*, make the Square ABCD, each Side whereof muſt be a *Model* and half; and the *Diagonal Lines* muſt be drawn in it from one Angle to the other; and where they interſect each other in the Point E, which is the Middle and Centre of the ſaid Square, the fixed Foot of the Compaſs muſt be placed, and towards each Angle of the Square muſt be marked a *Model*; and where the Points FGHI are, the Lines muſt be drawn which interſect at Right Angles with the ſaid *Diagonals*, and that they may touch the ſides of the Square in LMNO. Theſe ſhall be the Bounds of the *Projecture*; and how much the Length is, ſo much ſhall be the Breadth of the Horns of the *Abacus*.

The *Curvature*, or Hollowing of the *Abacus*, is made by laying along a Thread from one Horn to the other, which is from the Point L to the Point N, then from the ſaid Points draw two Arches of Circles, then ſet in one Foot of the Compaſſes in the Interſection at the Point P; with the other deſcribe the Arch, which will make the Hollowing or Curvature of the *Aſtragal* of the Column, and is ſo made, that the Tongues of the Leaves touch it, or rather advance a little beyond, and this is their *Projecture*. The Roſe ought to be as large as the fourth-Part of the Diameter of the Column at the Foot: The *Architrave*, *Frize*, and *Cornice*, (as I have ſaid) are to be a fifth-Part of the Height of the Column, and the whole is to be divided into twelve Parts, as in the *Ionick*: But here is the difference; in this the *Cornice* is divided into eight Parts and half; of one is made the *Intabliment*, of the other the *Dendiculi*, of the third the *Ovolo*, of the fourth and fifth the *Modilions*, and of the other three and half the *Corona* and the *Schima*. The *Cornice* hath as much *Projecture* as it is high; the Coffers or Places of the Roſes that go between the *Modilions* muſt be Square, and the *Modilions* as big as half the Plain of the ſaid Roſes. The Members of this Order have not been marked with Letters, as the foregoing, becauſe by them theſe may eaſily be underſtood.



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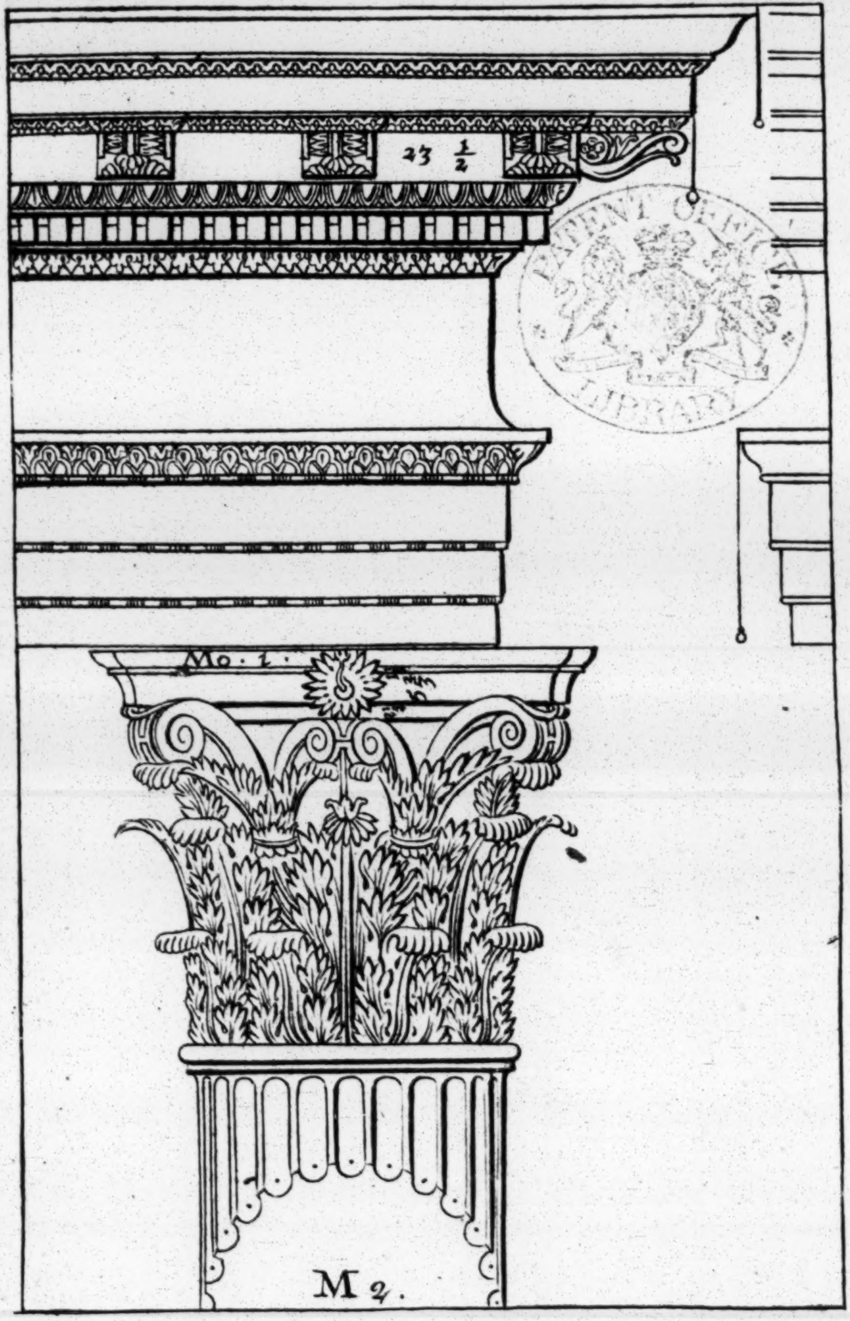
23 $\frac{1}{2}$
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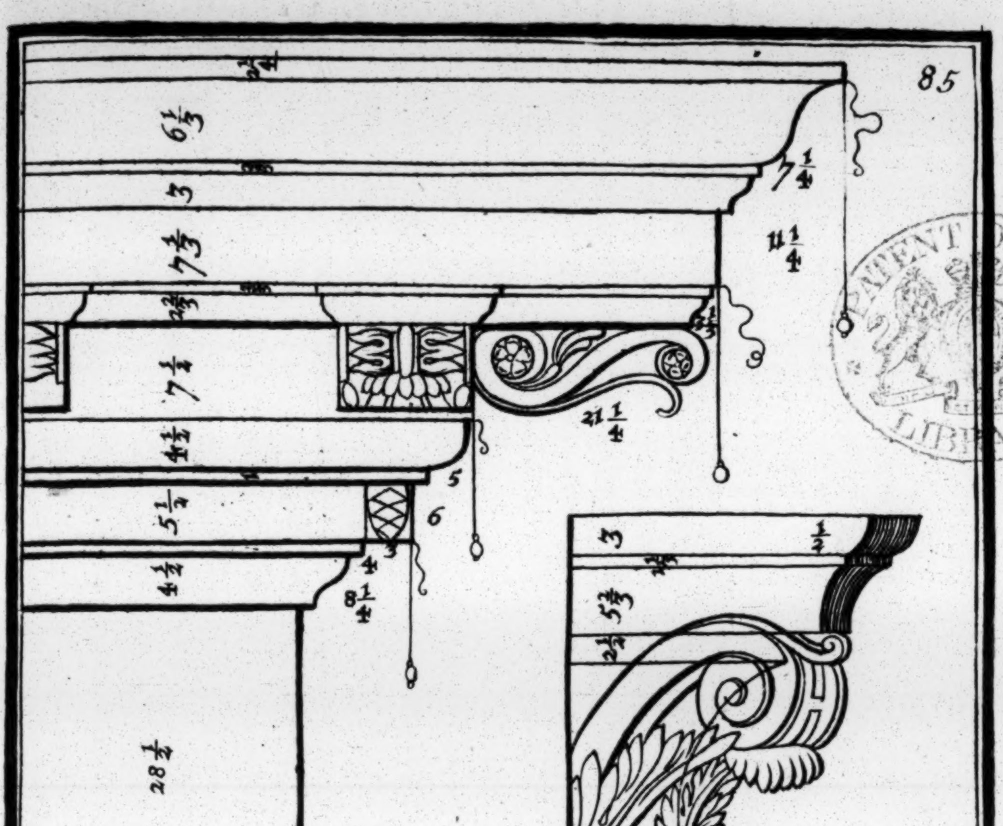
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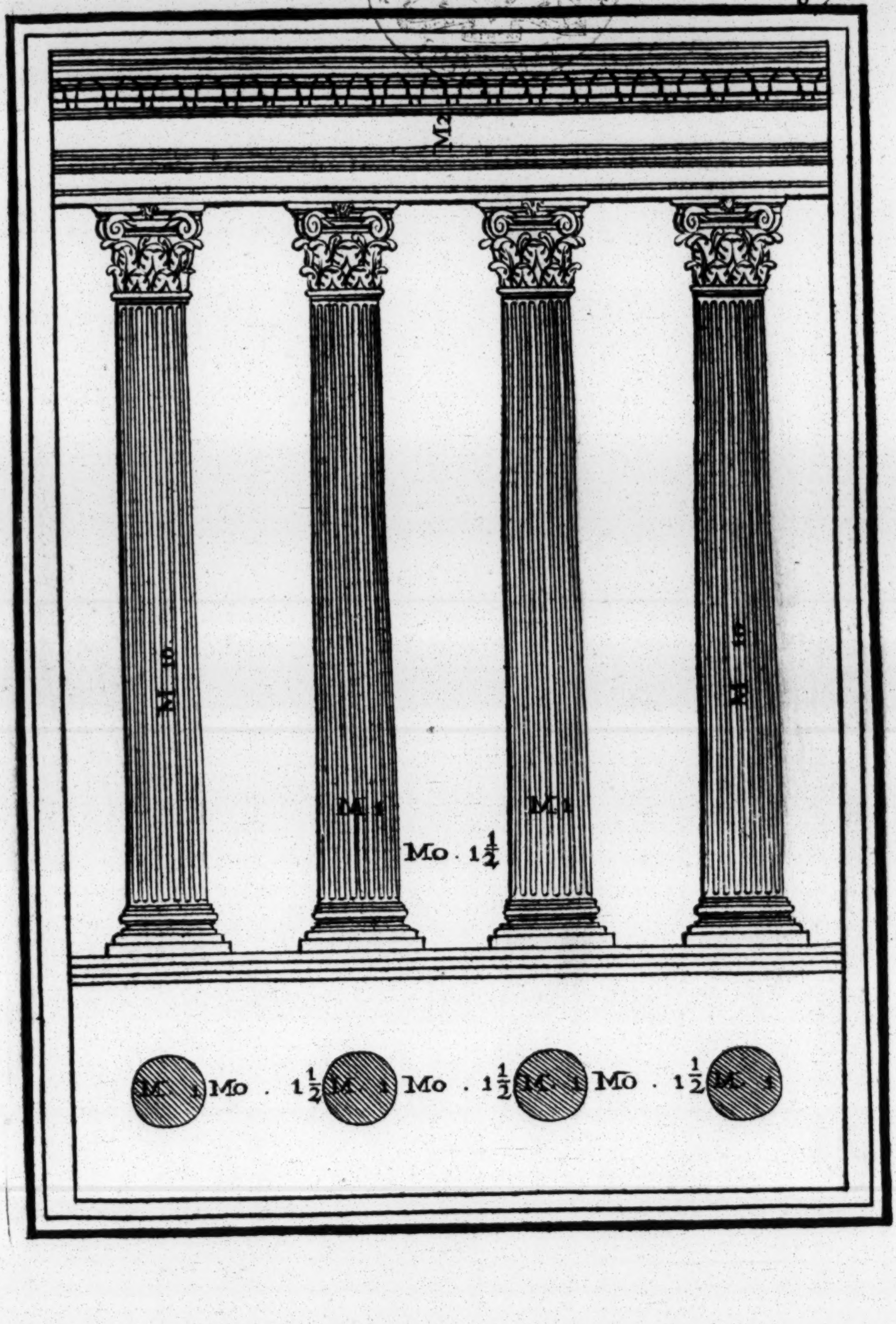
CHAP. XVIII.

Of the Compoſita *Order.*

THE *Compoſita* Order, which is alſo call'd *Roman*, becauſe it was an Invention of the Ancient *Romans*, and is ſo call'd, becauſe it partakes of two of the aforeſaid Orders; and the moſt Regular and Beautiful, is that which is compounded of the *Ionick* and *Corinthian*; it is more ſlender than the *Corinthian*; and may be made like it in all Parts, except in the *Capital*.

Theſe Columns ought to be in Length ten *Models*: In the Deſign of Columns alone, the Inter-Columns are one Diameter and a half; and this Manner is call'd by *Vitruvius*, *Picknoſtilos*. In thoſe of Arches, the *Pilaſters* are half the Light of the Arch; and the Arches are in Height under the Vault two Squares and half, that is to ſay, two Diameters and half of the Light of the Arch.


M 2
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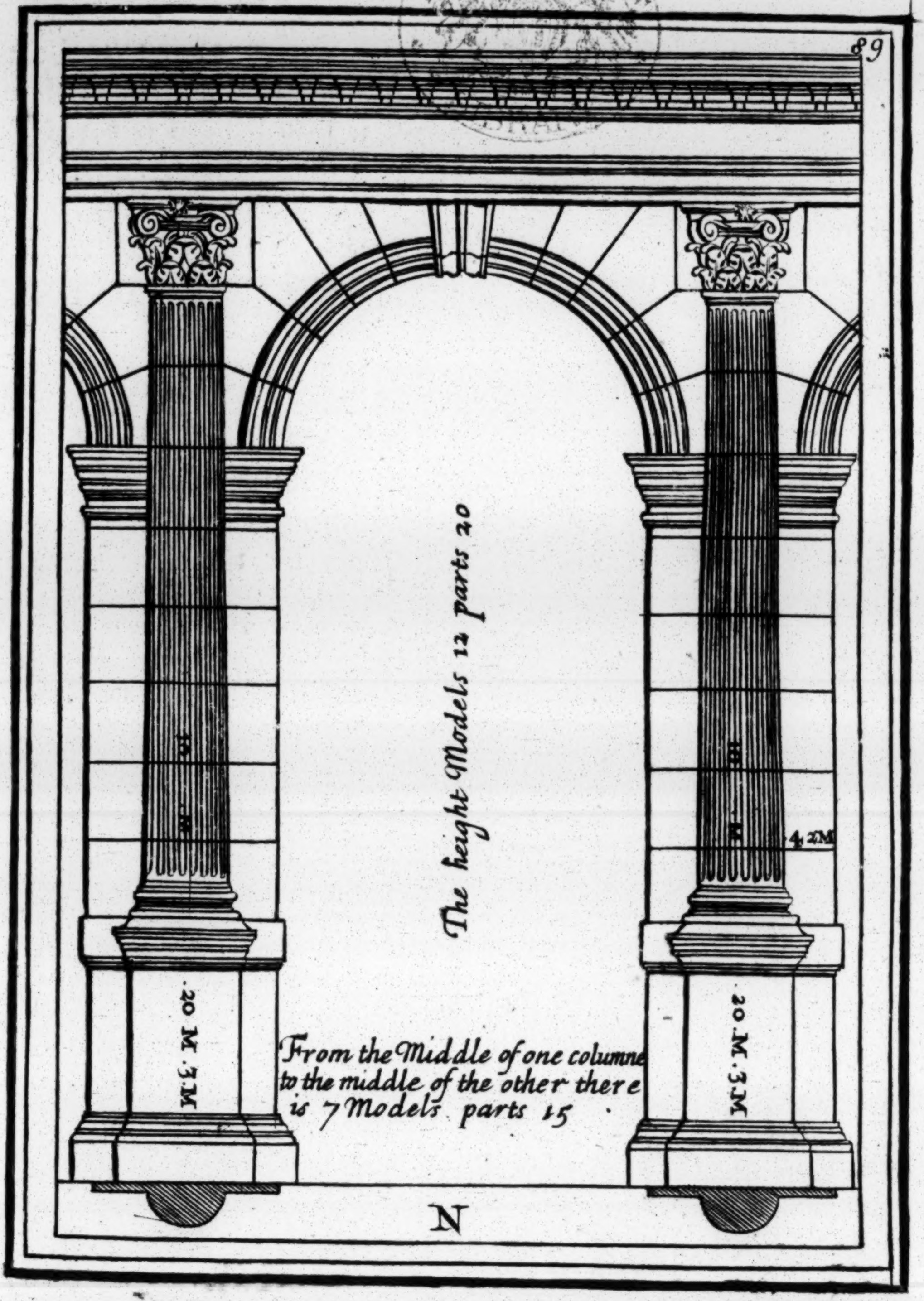
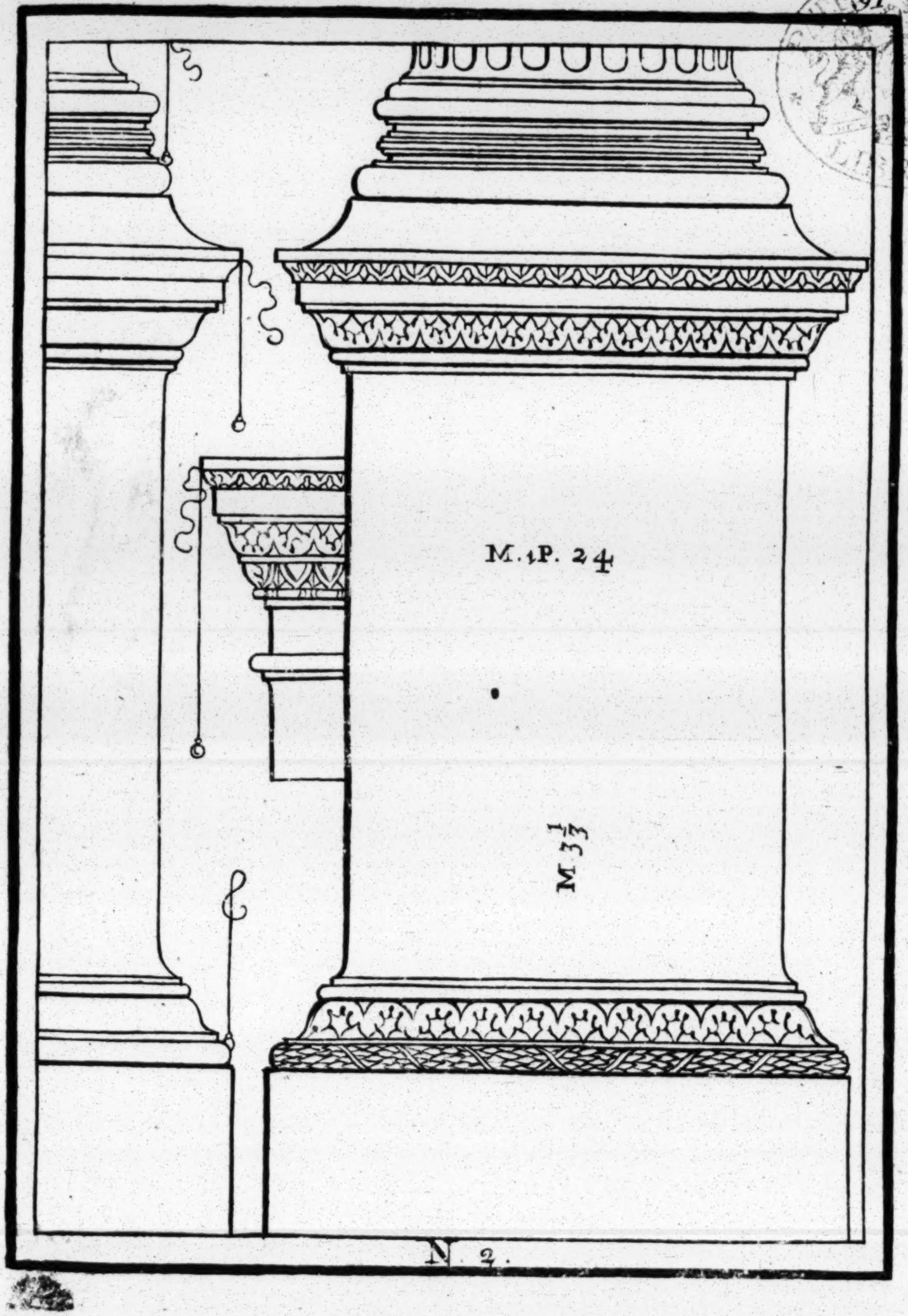
M. 1
M 9
Mo . 1½
M. 1 Mo . 1½ M. 1 Mo . 1½ M. 1 Mo . 1½ M. 1


The height Models 12 parts 20
20 M. 3 M
20 M. 3 M
4 2 M
From the Middle of one columne to the middle of the other there is 7 Models parts 15 .
N

And becauſe (as I have ſaid) this Order ought to be made more neat and ſlender than the *Corinthian*, its *Pedeſtal* is to be the third Part of the Height of the Column, and is divided into eight Parts and a half; of one Part is made the *Cymatium* of the *Baſe*, and five and half remains to the *Dado* or *Plinth*, of the *Pedeſtal*; the *Baſe* of the *Pedeſtal* is divided into three Parts, two are given to the *Zocco* or *Plinth*, and one to its *Torus* with *Cymatium*.

The Baſe of the Column may be made *Attick*, as in the *Corinthian*; and it may alſo be compounded of the *Attick* and the *Ionick*, as appears in the Deſign. The *Profile* of the Impoſt of the Arches is by the ſide of the Plain of the *Pedeſtal*, and its Height is as much as the Thickneſs of the *Membretto*.



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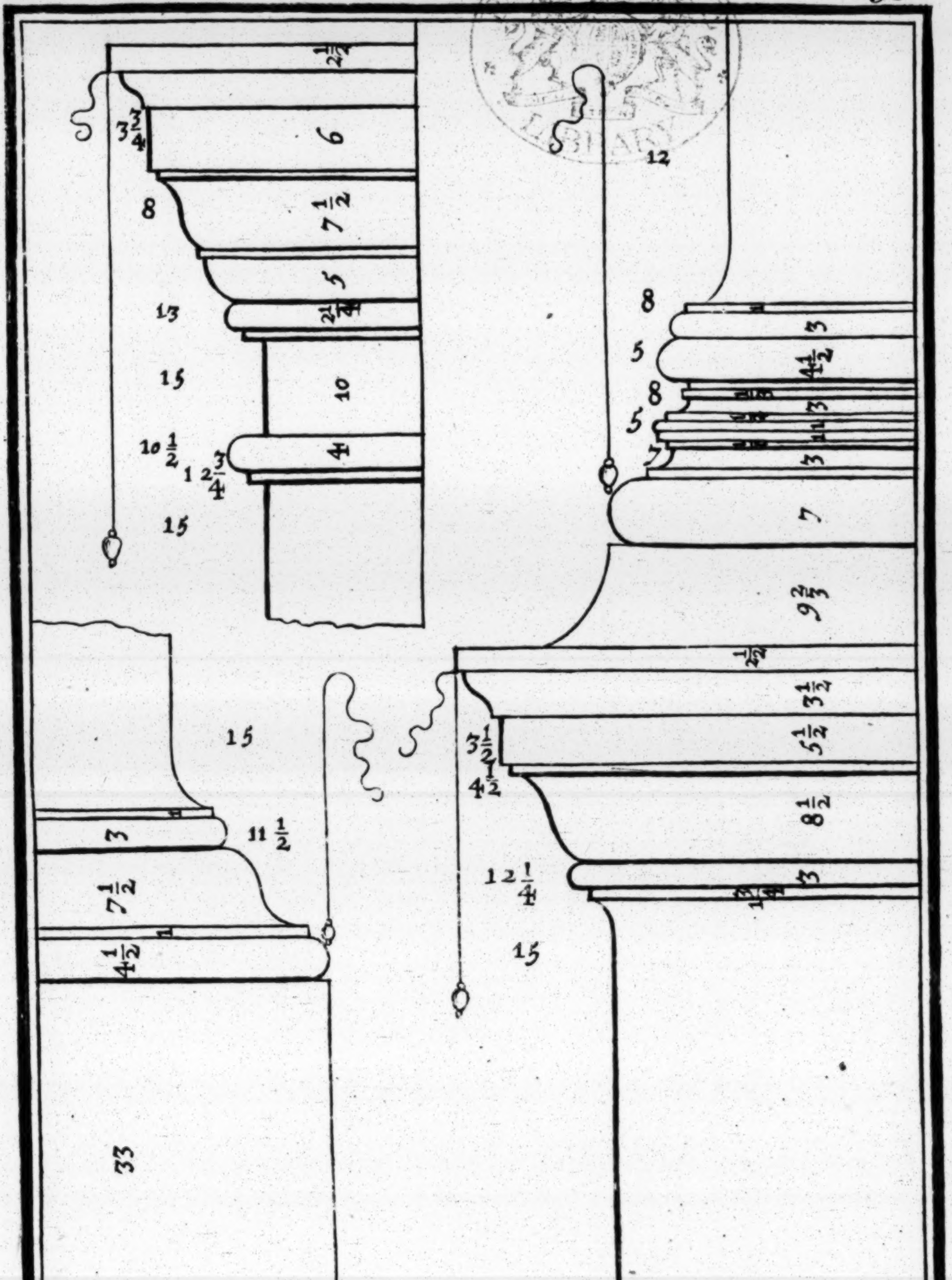

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12¼
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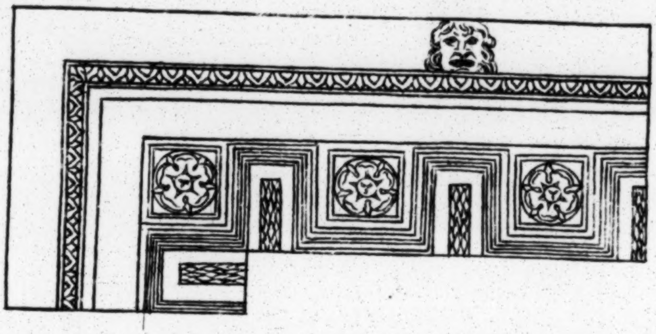
33

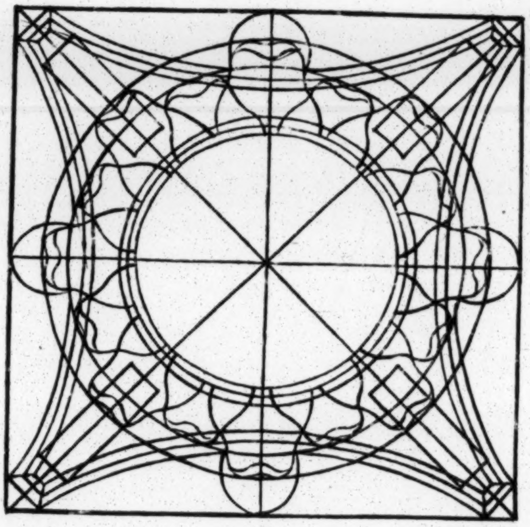
The Capital of the *Compoſita* Order hath the ſame Meaſures as the *Corinthian*; but it differs from it in the *Voluta*, *Ovolo*, *Fuſarolo* or *Fuſe*, which are Members attributed to the *Ionick*; and the way of making it is thus: From the *Abacus* downwards the Capital is divided into three Parts, as in the *Corinthian*: The firſt is given to the firſt Leaves, the ſecond to the ſecond, and the third to the *Voluta*, which is made in the ſame Manner, and with the ſame Points with the which the *Ionick* is ſaid to be made, and takes up ſo much of the *Abacus*, that it ſeems to grow out of the *Ovolo* near the Flowers which are put in the middle of the Curvatures of the ſaid *Abacus*, and is as Thick in the Front as the Breadth of the Horns thereof, and a little more: The *Ovolo* is as big as three Parts of five of the *Abacus*, and its lower Part begins right againſt the lower Part of the Eye of the *Voluta*: It hath in *Projecture* $\frac{3}{4}$ Parts of its Height, and is with its *Projecture* perpendicular to the Hollow of the *Abacus*, or a little more.

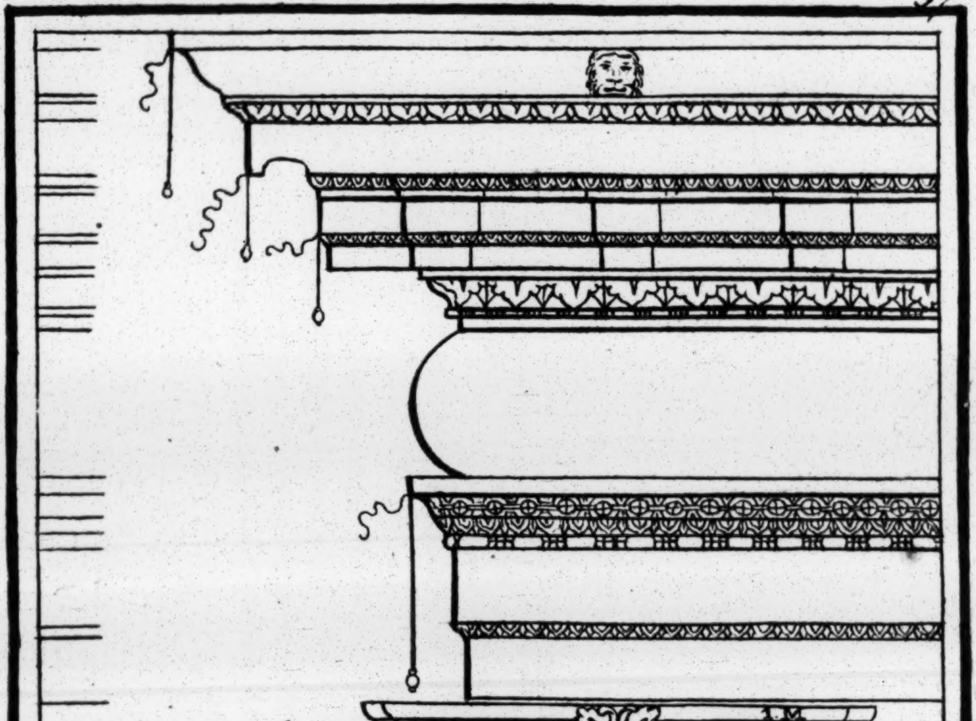
The *Fuſe* is a third Part of the Height of the *Ovolo*, and hath in *Projecture* ſomething more than the half of its Thickneſs, and turns about the Capital under the *Voluta*, and is always ſeen. The *Gardetten* or Moulding, which goes under the *Fuſe*, and makes the *Orlo* of the Bell of the Capital, is the half of the *Fuſe*: The Body of the Bell anſwers direct with the Bottom of the Flutes of the Column; of this ſort I have ſeen one at *Rome*, from which I have drawn the ſaid Meaſures, becauſe it appeared to me very beautiful, and well order'd.

There are Capitals made after another Manner, which may be call'd *Compoſita*, of which ſhall be diſcourſed, and the Figures thereof ſhall be put in my *Books of Antiquities*.

The *Architrave*, *Frize*, and *Cornice* are the fifth Part of the Height of the Column; and their Compartiments may be well known by that which hath been ſaid before in the other Orders, and by the Numbers placed in the Deſign.







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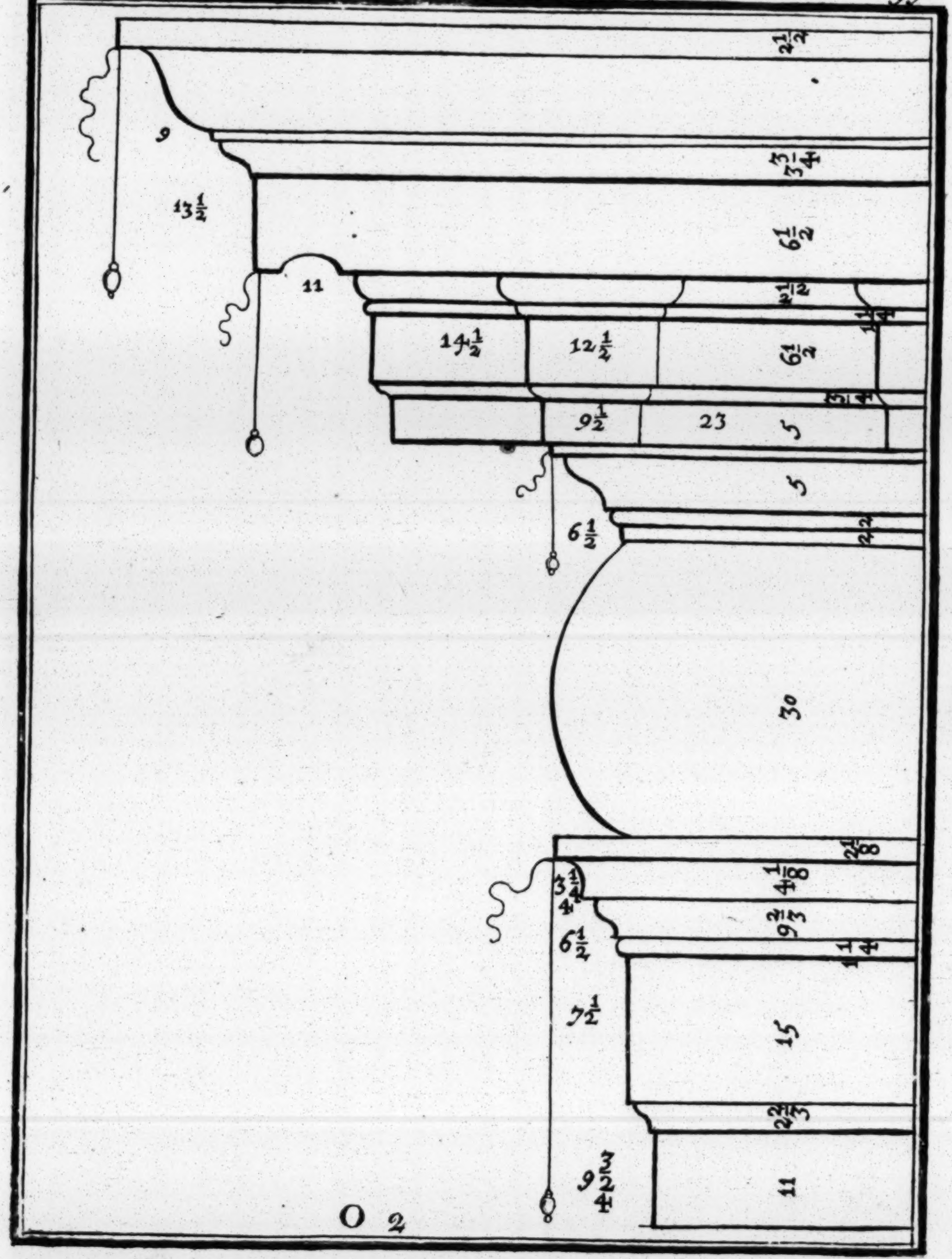
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6 1/2
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3 1/4
4 1/8
9 2/3
6 1/2
1 1/4
7 1/2
15
2 2/3
9 3/4
11

CHAP. XIX.

Of Pedeſtals.

Hitherto I have diſcourſed (what to me ſeemed convenient) of Walls, and their Ornaments, and in particular touching the *Pedeſtals*, which may be applied to every Order: But becauſe it appears that the Ancients had not a regard to make the *Pedeſtal* bigger for the one Order than for the other, although this Part much adds to the Beauty and Ornament, when it is made with Diſcretion and Proportion to the other Parts; to the end that the Architects may take notice, and ſerve themſelves, upon Occaſion, and know that they made them ſometimes Square, that is to ſay, as long as broad, as, in the Arch *Di Lioni* at *Verona*; and theſe I have aſſigned to the *Dorick* Order, becauſe it requires Solidity; ſometimes they are made taking the Meaſure from the Light of the Arch, as in the Arch of *Titus* at *Sancta Maria Nova* in *Rome*, and in that of *Trajan* on the Gate of *Ancona*, where the *Pedeſtal* is half the Height of the Light of the Arch, and of that kind of *Pedeſtal* I have put to the *Ionick* Order; and ſometimes they took the Meaſure from the Height of the Column, as is ſeen at *Suſa*, a City ſituate at the Foot of the Mountain which divides *Italy* from *France*, in the Arch made to the Honour of *Auguſtus Cæſar*, and in the Arch of *Pola*, a City of *Dalmatia*, and in the Amphitheatre of *Rome*, in the *Ionick* and *Corinthian* Order; in which Building the *Pedeſtal* is the fourth Part of the Height of the Column, as I have made in the *Corinthian* Order In *Verona*, in the Arch *Di Caſtel Vecchio*, which is very beautiful, the *Pedeſtal* is a third of the Height of the Column, as I have put in the *Compoſita* Order; and theſe are the handſomeſt Forms of *Pedeſtals*, and have the beſt Proportion with their other Parts And when *Vitruvius*, diſcourſing of Theatres, makes mention of the *Poggio*, you may know that the

Poggio

Poggio is the ſame with the *Pedeſtal*, which is the third of the Length of the Column, put for Ornament of the Scene; but of *Pedeſtals*, which exceed a third of the Column, ſuch are ſeen at *Rome* in the Arch of *Conſtantine*, where the *Pedeſtals* are two Parts and a half of the Height of the Column; and almoſt in all the ancient *Pedeſtals* the Baſes are obſerv'd to have been made twice as big as the *Cymatium*, (as is ſeen in my Book of *Arches*.)

* * *

CHAP. XX.

Of Errors.

HAving ſet down the Ornaments of the Architecture, that is to ſay, the five Orders, and ſhewn how they are made, and laid down the Profiles of each of their Parts, which I found that the Antients did obſerve; it ſeems to me not unfit here to acquaint the Reader of many Abuſes, which being brought in by the Barbarous, are yet obſerved; to the end that that the Studious in this Art may avoid them in their own Works, and underſtand them in others.

I ſay then, that *Architecture* (as other Arts are) being an Imitatrix of Nature, accounts nothing Tolerable, which is eſtranged and differs from that which is Natural: Wherefore we ſee that thoſe Ancient Architects who built with Timber, when they began to build with Stone, directed that the Columns might be leſs at the Top than at the Foot; taking Example from Trees, which are leſs at the Top than in the Trunk, and near the Root. Likewiſe, becauſe it is very convenient that thoſe Things upon which any great Weight is put, ſhould be preſſed, under the Column they put a *Baſe*, which with their *Torus* and *Scocia* ſeem by the Burthen over them to be ſwelled; ſo alſo in in the *Cornices* they bring in the *Trigliphs*, *Modilions*, and the *Dentils*, which ſhould repreſent the Heads of the Joiſts, which in the Ceiling are placed to bear up the Roof. The ſame may be obſerved in all other Parts, if you are Curious: And being ſo, you cannot but blame that Form of Building which deviates from that which Nature inſtructeth, and from that Simplicity which is directed in Things by her produced, framing (as it were) another Nature, and departs from the true, good, and handſome Manner of Buildings; for which reaſon you ought not (inſtead of Columns or *Pilaſters*, which are to bear up ſome great Weight) to place *Cartouches*, which are certain Scroles, which to the Intelligent ſeem Deformed, and to the Ignorant, rather Confuſion than Pleaſure; nor do they produce other Effects than encreaſe the Charge of the Builders. Likewiſe you muſt not make any of thoſe *Cartouches* come out of the *Cornice*; for it is requiſite that all the Parts of the *Cornice* be made to ſome End, and to make appear what it would be if the Work were framed of Timber. And beſides, being it is convenient that, to uphold a great Weight, ſomething ſolid and fit to ſupport that Weight be required, queſtionleſs thoſe *Cartouches* are altogether ſuperfluous, becauſe it is impoſſible that any Timber whatever could really perform what theſe ſeem; for feigning it ſelf to be ſoft and gentle, I know not by what Rule they put them under any thing heavy and hard. But that which (in my Opinion) imports much, is the Abuſe in making Frontiſpieces of Doors, Windows, and Galleries divided in the Middle, becauſe they were made to defend the Inhabitants from Rain; I know nothing more contrary to Natural Reaſon, than to divide and open that Part which the Antients, inſtructed by Neceſſity it ſelf, did make Whole, and raiſed in the middle, to ſhew that it ought to ſerve to defend the Inhabitants of the Houſe, and thoſe that enter therein, from Rain, Snow, and Hail. And although Variety and Novelty ſhould pleaſe all, yet we are not to go againſt the Precepts of Art, and that which Reaſon demonſtrates; whence we ſee, that although the Antients did vary, yet they never departed from the general and neceſſary Rules of Art, (as may be ſeen in my Book *of Antiquities*.) Alſo concerning the

Projecture of the *Cornice* and other Ornaments, 'tis no ſmall Abuſe, in making them come too forward; becauſe when they exceed that which according to Reaſon is fit for them, eſpecially if they be in a cloſe Place, they ſeem narrow and uncomely, and put Fear in thoſe which ſtand underneath, threatning always to Fall; you ought as much to avoid making the *Cornice* diſproportionable to the Column; putting great *Cornices* upon little Columns, or upon little Columns great *Cornices*, who doubts but that ſuch a Building will ſeem very ill-favour'd? Beſides, to make the Columns ſeem to be of ſeveral Parts, making Rings and Wreathings about them, as it were to hold them together, ought as much as may be to be avoided; becauſe how much the more intire and ſtrong the Columns appear, ſo much the more they perform the Deſign for which they are placed, which is to render the Work above ſecure and firm. Many other-like Abuſes might be reckon'd up, as of ſome Members which in the *Cornices* are made diſproportionable to the other; which by what I have ſhewn before, and by that which is now ſaid, may be eaſily known. It remains now, to come to the diſpoſing of the Particular and Principal Parts of the Building.

CHAP. XXI.

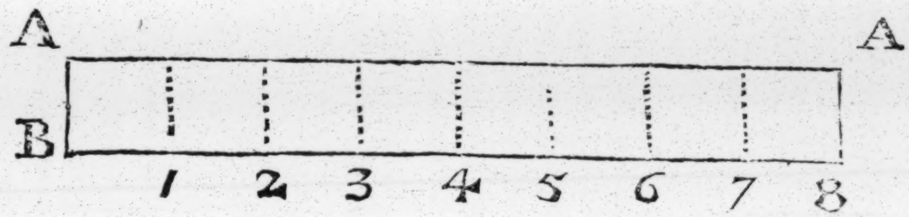
Of Galleries, Entries, Halls, Anti-Chambers *and* Chambers, *and of their Proportions.*

GAlleries, for the moſt part, are wont to be made on the Wings and Sides, or on the Front; they ſerve for many Accommodations, as Walking, Eating, and other Divertiſements, and they are made bigger or leſſer, according to the Greatneſs and Conveniency of the Building; but ordinarily they ought not

not to have leſs than 16, 18, and 20 Foot in Breadth, and in great Buildings unto 24; and their Length at five times their Breadth, ſix, ſeven, or eight at moſt.

Example.

Let A A repreſent a *Gallery*, the Breadth whereof is A B; you muſt give it in Length five times its Breadth unto the Number marked 5, or ſix times unto the Number 6, or ſeven times unto the Number 7, or laſtly, eight times unto the Number 8, which is the greateſt Length allowed to *Galleries*.



And beſides, every Houſe well compoſed, ought to have in the middle and chiefeſt Part ſome Place to the which all the other Part of the Houſe may relate and appertain; which Place vulgarly is call'd *Entry*, *Lobby*, or *Paſſage*, if it be below; and the *Hall*, if it be above, and is in the Houſe as a Common Place; for it ſerves to entertain thoſe who attend the Maſter's going forth, to ſalute him, and negotiate with him; and ſuch Places are the firſt Part of the Houſe that preſent themſelves to thoſe that would enter therein. The *Halls* ſerve for Feaſts, Nuptials, and Banquets, to act Comedies, and to take other ſuch-like Pleaſures and Enjoyments; therefore it is that theſe Places ought to be greater than other, and of a capacious Form, to the End, that many Perſons may commodiouſly be there entertained, and behold what is done.

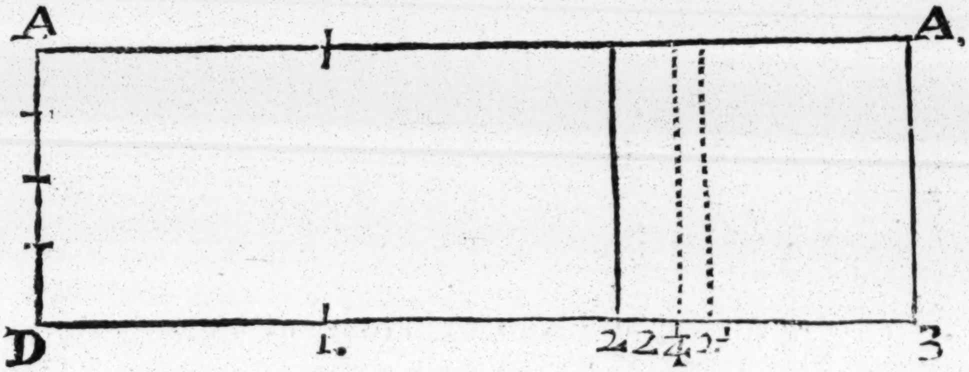
Of the Proportion which the Halls ought to have.

As for my part, I have not been accuſtomed to allow to the Length of *Halls* leſs than twice their Breadth, or twice and $\frac{1}{4}$ or $\frac{1}{5}$

Part of the Breadth at moſt. And to great Buildings you may allow the Length to be three times the Breadth, whereupon they will be ſo much the more Beautiful and Convenient.

Example.

Let A A preſent a *Hall*, the Breadth whereof is A D, having 24 Foot; within the Work you may allow the Length twice the Breadth unto the Number marked 2; to wit 48 Foot in Length for 24 Foot in Breadth, or twice the Breadth, and ¼ more unto the Number marked 2 ¼, to wit, 54 Foot long for 24 Foot broad, or twice the Breadth, and ⅓ more unto the Number marked 2 ⅓, to wit 56 Foot long for 24 Foot broad; or laſtly, to great Buildings the *Hall* may have in Length three times the Breadth unto the Number marked 3, to wit, 72 Foot loong for 24 Foot broad.



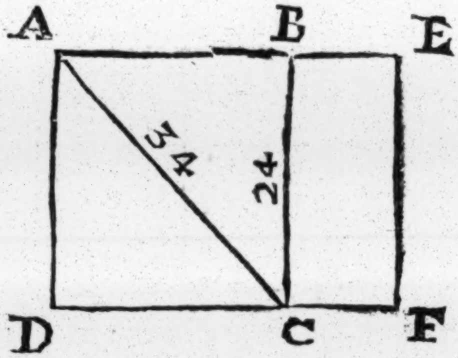
The *Anti-Chambers* and *Chambers* ought to be ſo divided that they fall on each Side of the *Entry*, and of the *Hall*; and you muſt take heed that thoſe on the Right Hand may anſwer and be equal to thoſe on the Left, to the end that the Building may be on one Side as on the other, and the Walls bear equally the Burden of the Roof.

Of the Proportion of Anti-Chambers.

A well proportion'd *Anti-Chamber* ought to have in Length the *Diagonal*-Line of the Square of the Breadth, or the Breadth and ¼ at moſt.

Example of the firſt Bigneſs of Anti-Chambers.

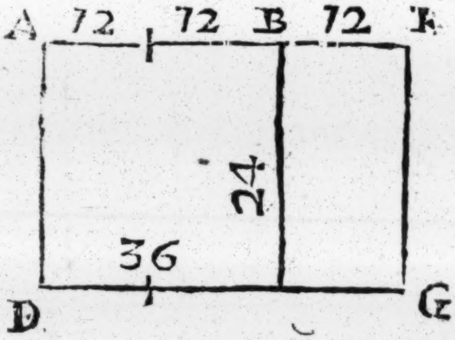
Let ABCD be a Square, whereof each Side is 24 Foot; and the *Diagonal*-Line thereof being drawn AC, the ſame Length that the *Diagonal* is of, you muſt give to the ſaid *Anti-Chamber* from A unto E, and from D unto E, in this manner.



The *Anti-Chamber* will have 34 Foot in Length to 24 Foot in Breadth.

Example of the Second Bigneſs of Anti-Chambers.

Let ABCD be a Square, of which each Side is 24 Foot, as before, and to the ſaid ABCD the half their Length, to wit, 12 Foot from B to F, and from C to G, you ſhall make the *Anti-Chambers* 26 Foot in Length to 24 Foot in Breadth.



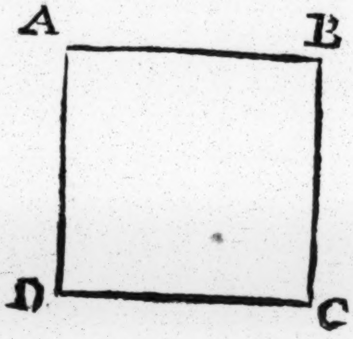
Of the Proportion of Chambers.

As for the *Chambers*, you may make therefore five Sorts and Proportions ; for they are either Square, or they may be in Length their Breadth, with an eighth Part, a ſeventh, a ſixth, or a fifth Part above their Breadth.

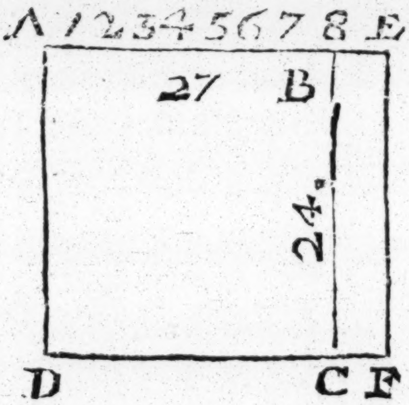
Example

Example of the Firſt Bigneſs of Chambers.

Let ABCD be a perfect Square, of which the four Sides and the four Angles may be equal, this ſhall be the Bigneſs of the *Chamber*.



Example of the Second.

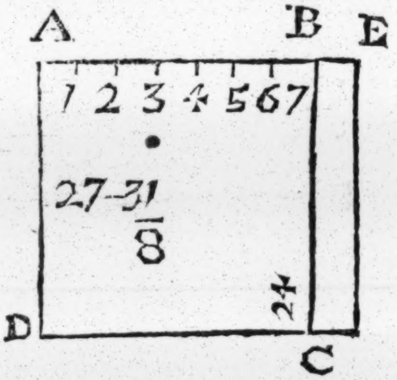


Let A B C D be a Square, whereof each Side is 24 Foot ; you may divide one of the ſaid Sides into eight equal Parts, whereof each may be three Foot ; add one of the ſaid Parts to the Side A B, and continue it to E, and as much to the Side DC continue to F, and you will make the *Chamber* 27 Foot Long, to the 24 Foot Broad.

Example

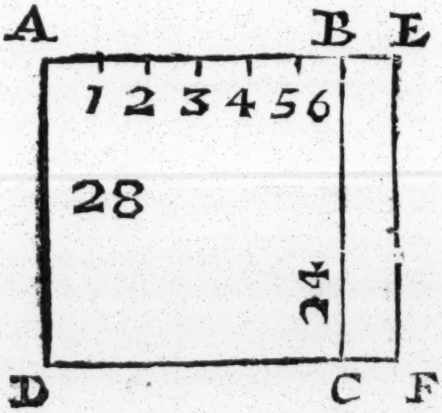
Example of the Third.

Let ABCD be a Square, as before, of 24 Foot to each Side ; divide the Side of A B into ſeven equal Parts ; add to it one, continuing the ſame to E, and the Side D C unto F, the ſaid *Chamber* will have 27 Foot 5 Inches and ½ Part in Length, to 24 Foot in Breadth.



Example of the Fourth.

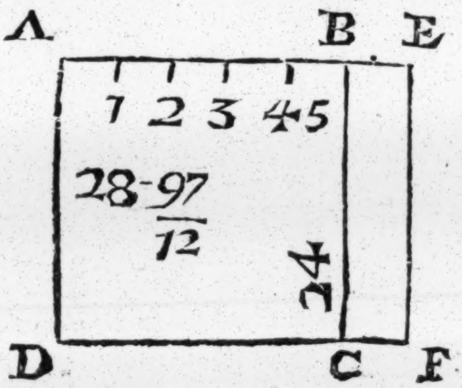
Let ABCD, as before, be Square, having on each Side 24 Foot: Divide one of the Sides, as A B, into ſix equal Parts ; add thereunto one of the ſaid Parts, drawing the ſaid Side unto E, and DC unto F, you will make the *Chamber* 28 Foot Long, to 24 Foot Broad.



Example

Example of the Fifth and laſt Bigneſs of Chambers.

Let the Figure ABCD be as before, each Side thereof to be 24 Foot: Divide one of the Sides into five equal Parts; add one of the ſaid Parts, drawing the Side A B unto E, and D C unto F, you will make the *Chamber* 24 Foot 9 Inches, and 7 $\frac{1}{2}$ in Length, to 24 Foot in Breadth.



C H A P.

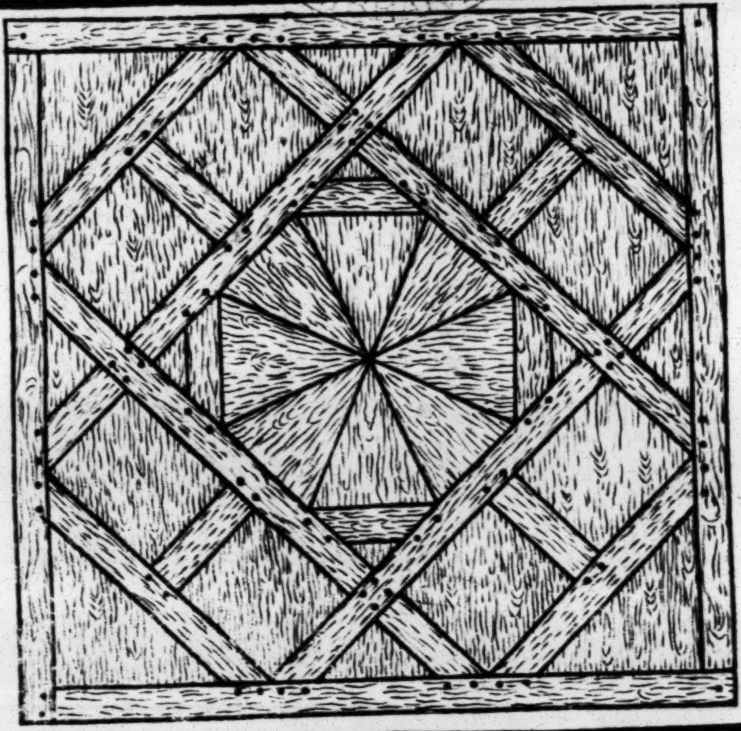
CHAP. XXII.

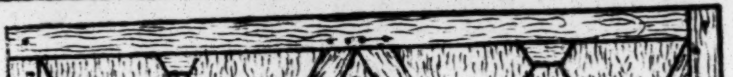
Of Floors *and* Superficies; *of* Departments, Planchers, *and* Flat Ceilings.

AFter having ſeen the Forms of *Galleries*, *Halls*, *Anti-Chambers*, and *Chambers*; it is needful to Diſcourſe of *Floors* or *Superficies*, of *Departments*, *Planchers*, and *Flat Ceilings*.

Floors or *Superficies* may be of Square Tiles, or hard Stone, or of Marble, or ſmall Squares of Carpenters Work, and may be made of divers Sorts, and divers Colours, according to the variety of the Materials, which render them very agreeable to the Eye: In Lodging *Chambers* they are ſeldom made of Marble, or other hard Stone, becauſe in the *Winter* they will be too cold; but in *Galleries*, or other Publick Places, they will agree very well.

This ſort of Floors *of ſmall Squares of Carpenters Work may be ſeen at* Somerſet-Houſe; *which, being a Novelty in* England, *I thought good to preſent the Deſign thereof, although not in my Author.*





You muſt take heed that the *Hall*, *Anti-Chambers*, and *Chambers* which are of the ſame Story, may have all the Floors or Pavements equal, in ſuch manner that the Threſholds may not be higher than the reſt.

The *Flanchers* are alſo made divers ways; for ſome there are that take pleaſure to make them very handſome, of well-wrought Joiſts; where you may take notice, that the Joiſts muſt be diſtant the one from the other the Thickneſs of a Joiſt and half, and ſo the Ceiling will be very handſome: And there will be ſo much Wall between the Ends of the Joiſts, as will be ſufficient to bear up the Walls about it; whereas if they ſtand wider one from the other, it will be very ill-favour'd; and if cloſer, 'twill be as a dividing of the upper Wall from the lower; and if the Joiſts rot, or be conſumed by Fire, the Wall, of neceſſity, muſt be ruin'd.

Others will have Compartments of Plaiſter, or Wood, enriching them with Pictures, and guilded Work, and Beautify them according to their various Humours; wherefore in this there can be given no certain or determinate Rules.

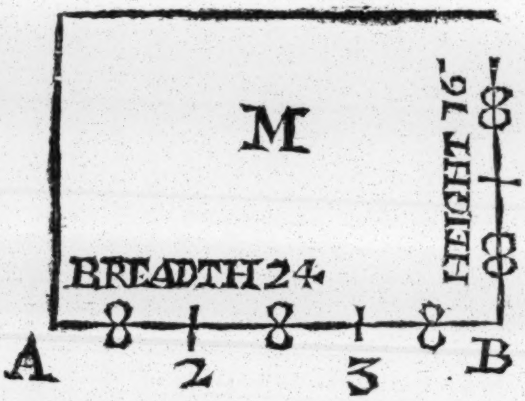
CHAP. XXIII.

Of the Height of Halls, Anti-Chambers, *and* Chambers.

H*Alls*, *Anti-Chambers*, and *Chambers* are made either Arched, or Flat: If you make them Flat, divide the Breadth into three Parts, and two of thoſe Parts ſhall be the Height of the Story, from the Floor to the Joiſt.

Example of the Firſt Height of Halls, Anti-Chambers, *and* Chambers,

Let the Figure M repreſent the *Chamber*, whoſe Height you would find, which ſuppoſe to have in Breadth 24 Foot within the Work, which ſhall be divided upon the Line A B into three equal Parts, with Points, where is marked the Numbers 1, 2, 3, each Part being 8 Foot; two of each Parts ſhall be the Height of the *Chamber*, to wit, 16 Foot from the Floor to the Joiſt.

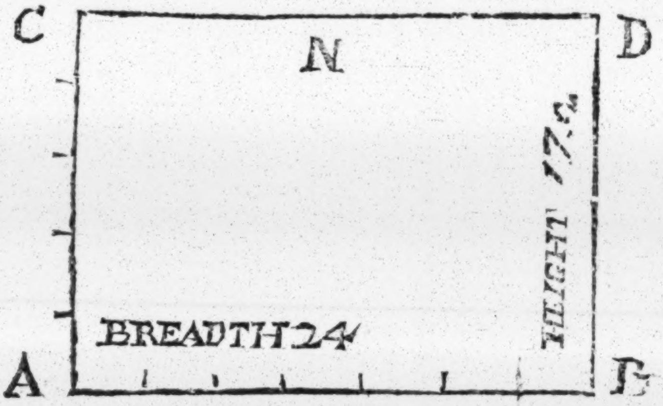


And if you would have it Higher, the Breadth muſt be divided into ſeven Parts; take thereof five, which will give the Height.

Example

Example of the Second Height.

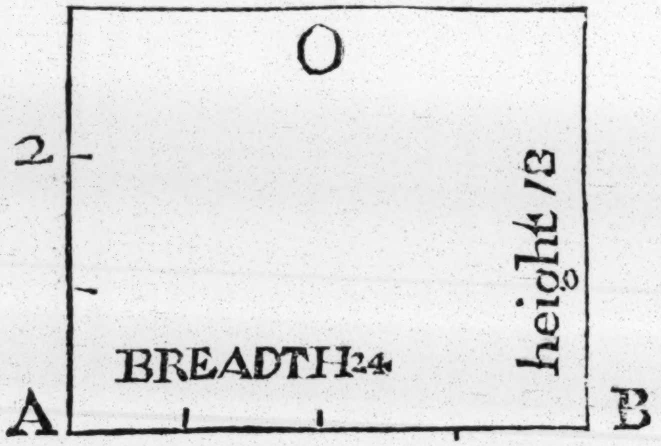
Let the Figure N be of the ſame Breadth as the foregoing, to wit, 24 Foot within the Work, which ſhall be divided upon the Line A B into ſeven equal Parts; take thereof five to make the Height of the Story A C and B D, the ſaid Height will be 17 Foot 2 Inches from the Floor unto the Joiſts.



Or divide the ſaid Height into four Parts, and three of thoſe Parts will likewiſe give a greater Height.

Example of the Third Height, yet higher.

Let the Figure O be of the ſame Breadth as the former, to wit, of 24 Foot within the Work, which ſhall be divided upon the Line A B into four equal Parts, three whereof you muſt take for the Height of the Story, ſo it will be of 18 Foot from the Floor to the Joiſt.



CHAP. XXIV.

Of the Proportion of the Height of Chambers *of the Second Story.*

THE Height of *Chambers* of the Second Story ſhall be a Twelfth Part leſs than the *Chambers* below.

Example of the Height of the Second Story in the Figure marked M.

Be it, as it is ſaid in the Figure marked M, its firſt Story 16 Foot from the Floor to the Joiſt, divide the ſaid 16 Foot into

Twelve equal Parts; take Eleven, which will make 14 Foot 8 Inches for the Height of the Second Story from the Floor to the Joiſt.

Example of the Second Story of the Figure marked N.

Be it, as it is ſaid in the Figure marked N, its Firſt Story of 17 Foot 2 Inches High from the Floor to the Joiſt, divide the ſaid 17 Foot 2 Inches into Twelve equal Parts, take thereof 11, which will make 15 Foot 7 Inches for the Height of the Second Story from the Floor to the Joiſt.

Example of the Height of the Second Story of the Figure O.

Be it, as it is ſaid in the Figure O, its Firſt Story of 18 Foot from the Floor to the Joiſt, divide the ſaid 18 Foot into Twelve equal Parts, take thereof 11, which will make 16 Foot and a half for the Height of the Second Story from the Floor to the Joiſt.

* * *

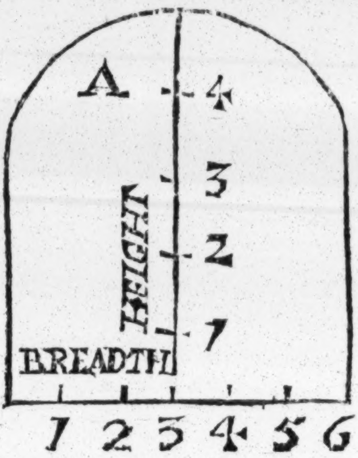
CHAP. XXV.

Of the Proportion of Halls, Anti-Chambers, *and* Chambers *of the Firſt Story, which are Arched.*

IN great Buildings, the *Hall*, *Anti-Chambers*, and other Rooms of the Firſt Story, may be Arched; whereupon they will be much more handſome, and leſs ſubject to Fire: Their Height is made by dividing the Breadth into ſix Parts; and thereof take five, which will give the Height that it ought to have from the Floor or Superficies, unto the Bottom of the Key of the Arch.

Example of the Firſt Height of Halls, Anti-Chambers, *and* Chambers *which are Arched.*

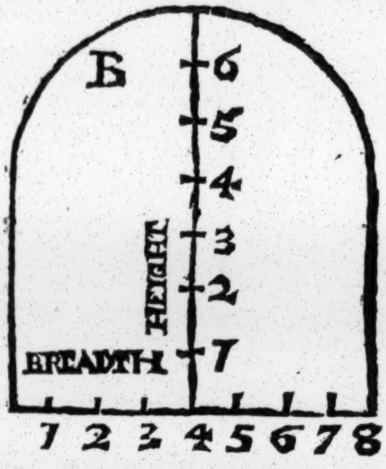
Let the Figure marked A be of 24 Foot in Breadth, more or leſs, and be divided into ſix equal Parts; take thereof five which will make it 20 Foot high from the Floor unto the bottom of the Key of the Arch.



And if you would have one higher, you muſt divide the ſaid Breadth into eight Parts, and ſeven thereof ſhall be the Height.

Example of the Second Height.

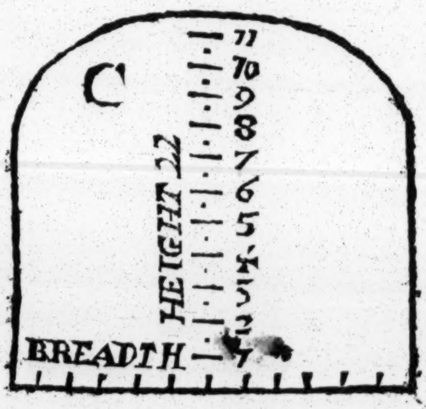
Let the Figure B, having the ſame Breadth as the former 24 Foot within the Work, be divided into eight equal Parts, and take thereof ſeven, which will make 21 Foot for the Height from the Floor unto the bottom of the Key of the Arch.



And if you divide the ſame Breadth into Twelve Parts, you muſt take thereof Eleven, which will make it higher.

Example of the Third, yet higher.

Let the Figure C be of 24 Foot broad within the Work, as the former; divide the 24 Foot into Twelve equal Parts, take thereof Eleven, which make 22 Foot in height from the Floor unto the bottom of the Key of the Arch.



CHAP. XXVI.

Of the Proportion of the Height of Chambers *of the Second Story.*

THE *Chambers* of the Second Story muſt be raiſed a ſixth Part leſs than the *Chambers* below.

Example of the Height of the Second Story of the Figure marked A.

Be it, as it is ſaid in the Figure marked A, its Firſt Story of 20 Foot in Height, from the Floor unto the bottom of the Key of the Arch; divide the ſaid 20 Foot into ſix equal Parts; take thereof five, which will make the Second Story 16 Foot 8 Inches from the Floor to the Joiſt.

Example of the Height of the Second Story of the Figure marked B.

Be it, as it is ſaid in the Figure B, its Firſt Story of 21 Foot in Height from the Floor unto the bottom of the Key of the Arch; divide the ſaid 21 Foot into ſix equal Parts; take thereof five, which will make the Second Story 17 Foot 6 Inches in Height from the Floor unto the Joiſt.

Example of the Height of the Second Story of the Figure marked C.

Be it, as it is ſaid in the Figure marked C, its Firſt Story is of 22 Foot in Height from the Floor unto the bottom of the Key of the Arch; divide the ſaid 22 Foot into ſix equal Parts; take thereof five, which will make the Second Story 18 Foot 4 Inches in Height from the Floor unto the bottom of the Key of the Arch.

CHAP. XXVII.

Of the Proportion of the Third Story.

IF you would make above the Second Story an Antique or Third Story, the Second muſt always be divided into twelve equal Parts, nine whereof will give the Height of the Third Story from the Floor unto the bottom of the Joiſt.

In the Building of *Chambers*, you ought to have regard as well to the Place of the Bed, which is uſually ſix or ſeven Foot Square; and the Paſſage, as well as to the Situation of the Chimney, which for this Conſideration ought not to placed juſt in the middle, but diſtant from it about 2, or 2 Foot and a half, to the end it may make room for the Bed; and by this means the Inequality is little diſcerned, if it be not in Buildings the Breadth at leaſt of 24 Foot within the Work, and in this Caſe it may be placed juſt in the middle.

* * *

CHAP. XXVIII.

Of the Height of Galleries.

THE Lower *Galleries* muſt be as high as the the *Halls*, *Anti-Chambers*, and *Chambers* of the Firſt Story, to the end that one may enter therein on even Ground, which is to be underſtood then when the ſaid Lower *Galleries* have the ſame Framing with the ſaid *Hall*, *Anti-Chambers*, and *Chambers*, whoſe Floors ought ordinarily to be raiſed higher than the Groundwork of the Court about two Foot at leaſt, or of three or four Foot, and is aſcended by Steps, which ought not to have more than ſix Inches in Height, nor leſs than four, and in Breadth one Foot, or at the moſt 15 or 16 Inches.

But if the *Galleries* be made all open, ſo as they enter into it from the Court; in this caſe you may lay the Floor lower than the neighbouring Rooms, and 'twill ſuffice that the ſaid Floor be one Foot higher than the Ground-work of the Court; thus doing, 'twill appear very graceful; for by this means they come near to the fair Proportion which they ought to have in their Height from the Floor or Superficies unto the bottom of the Key of the Arch, and their Entrance is by Steps which are between the opening of the Arches.

CHAP. XXIX.

Of the juſt Proportion which the Upper Galleries *ought to have.*

THE Upper *Galleries* are made either Flat or Arched; if Flat, they muſt be as high as broad: *Galleries* which are Arched muſt be as high as broad, with a fifth, fourth, or third Part over and above their ſaid Breadth.

CHAP. XXX.

Of the Meaſures of Doors *and* Windows.

THE certain and determinate Meaſures cannot be given of the Height and Breadth of Principal *Gates* of Buildings: Not of *Doors* and *Windows* of *Chambers*; becauſe, for to make the Principal *Gates*, the Architect muſt accommodate them to the Greatneſs of the Building, and the Quality of the Maſter, and the Uſe that is to be made of them; nevertheleſs, we will not omit to give the Meaſures following.

CHAP. XXXI.

Of the Proportion of Principal Gates.

PRincipal *Gates* of Entrance, where Coaches and Waggons ought to paſs, and other ſuch Neceſſaries, muſt not have leſs than ſeven and a half, eight, or nine Foot, and to great Buildings, unto ten or twelve Foot in Breadth.

Their Height muſt be their Breadth and half at leaſt; and to have it well proportion'd, you muſt give it in Height twice their Breadth.

* * *

CHAP. XXXII.

Of the Proportion of Inner-Doors.

D*Oors* within the Houſe, in the leaſt Building, ought not to have leſs than two Foot and a half in Breadth, and five Foot and a half in Height: Thoſe from three to four Foot broad muſt have in Height twice their Breadth; and to great Buildings you may allow ev'n to five or ſix Foot in Breadth, and the Height double, and ſometimes a fifth or fourth Part leſs than their Breadth.

The Antients were wont to make their *Doors* narrower above than below, as may be ſeen in a Church which is at *Tivoli*, (as *Vitruvius* teacheth;) and it is likely they did ſo, to give them more Force.

CHAP. XXXIII.

Of the Proportion of Windows.

THE Apertures of *Windows* muſt have 4 Foot and half, or 5 Foot, and to great Buildings unto 6; between the two Jaums their Height muſt be at leaſt double their Breadth; and to make them comely and well-proportioned, a fourth Part, a third, or a half Part more than the Breadth: And according to the Bigneſs of theſe, you may make all the reſt in the other Rooms of the ſame Story; but thoſe of the Second Story ought to be lower by one twelfth Part than thoſe of the Firſt; and if you make *Windows* above them, you ought to make them a fourth Part lower than thoſe in the Second.

CHAP. XXXIV.

Of the Proportion of Soils *of* Windows.

THE *Soils* of *Windows* muſt have 2 Foot 8 Inches, unto 3 Foot at moſt in Height. The *Tranſoms*, or Croſs-pieces of *Windows*, muſt be 4 or 5 Inches Thick; their *Rebates* muſt be from 1 Inch and half unto 2 Inches at moſt, to the end they may have greater Strength, and that the Frames of Wood which carry the Shutters may have convenient Strength. The Jaums of *Windows* muſt be much rebated and let in from 2 Inches and ½ to 3 Inches at leaſt, to the end that the Wooden Frames may be ſtrong, and join to the Wall; when the Wall is thin, the Shutters of the *Windows* ought to ſhut over the *Rebates* the half, or one third only; alſo it is needful to divide the ſaid Shutters, that they may not be a hindrance to the Chamber, nor obſcure the Light.

CHAP. XXXV.

Rules to be obſerved in making Doors *and* Windows.

IN making *Windows*, you are to take heed that you do not give them more or leſs Light than is neceſſary, nor make them wider or narrower than is needful; wherefore you ought to have regard to the Greatneſs of the Places which ſhould receive the Light, it being evident that a great Room hath need of more Light, than a little one: So that if the *Windows* be made leſs than they ought to be, the Place will be obſcure and Dark. And becauſe in Houſes ſome *Chambers* are made large, ſome indifferent, ſome little, you muſt take great Care that all the *Windows* may be equal one with the other in their Rank, and Order, ſo that thoſe on the Right Hand may anſwer thoſe on the Left, and thoſe above may be right over thoſe below. Likewiſe the *Doors* muſt be right over one another, to the end that the Void may be upon the Void, and the Full upon the Full: Moreover, let the *Doors* be placed in ſuch manner, that one may ſee from one end of the Houſe to the other, which is very graceful: And beſides, 'tis cool in Summer, and hath many other Conveniencies.

It is very ſecure to turn *Arches* over *Doors* and *Windows*, which *Arches* do diſcharge and hinder that the *Doors* and *Windows* be not preſſed with too much Weight, which is of great Importance for the Laſtingneſs of Buildings.

The *Windows* muſt be conveniently diſtant from the Corners and Angles of the Building; becauſe that Part ought not to be open and infeebled, whoſe office is to ſupport and faſten all the reſt of the Building.

CHAP. XXXVI.

Of the juſt Proportion which the Pilaſters *of* Doors *and* Windows *ought to have in Thickneſs and Projecture.*

Pilaſters of *Doors* and *Windows* ought not to be Thicker than the fifth Part of their Aperture, nor leſs than a ſixth.

The *Projecture* of *Pilaſters* in general, is ſound, by dividing their Thickneſs into ſix Parts, and one of thoſe Parts muſt be the *Projecture* they ought to have.

It remains, to ſee their Ornaments.

CHAP. XXXVII.

Of the Ornaments of Doors *and* Windows.

HOW to adorn the *Windows* and Principal *Doors* in Buildings, may eaſily be known, from that which *Vitruvius* teacheth in the ſixth Chapter of his fourth Book; adding thereunto all that the Reverend *Daniel Barbero* hath ſaid thereon, and ſhewn in Deſign, and alſo of that which I have ſaid beſore of all the Five Orders; therefore leaving that, I ſhall only put ſome Deſigns of the Ornaments of *Doors* and *Windows* of *Chambers*, ſo as they may be made divers Ways; and I ſhell mark particularly every Member which is graceful, and how much *Projecture* is needful.

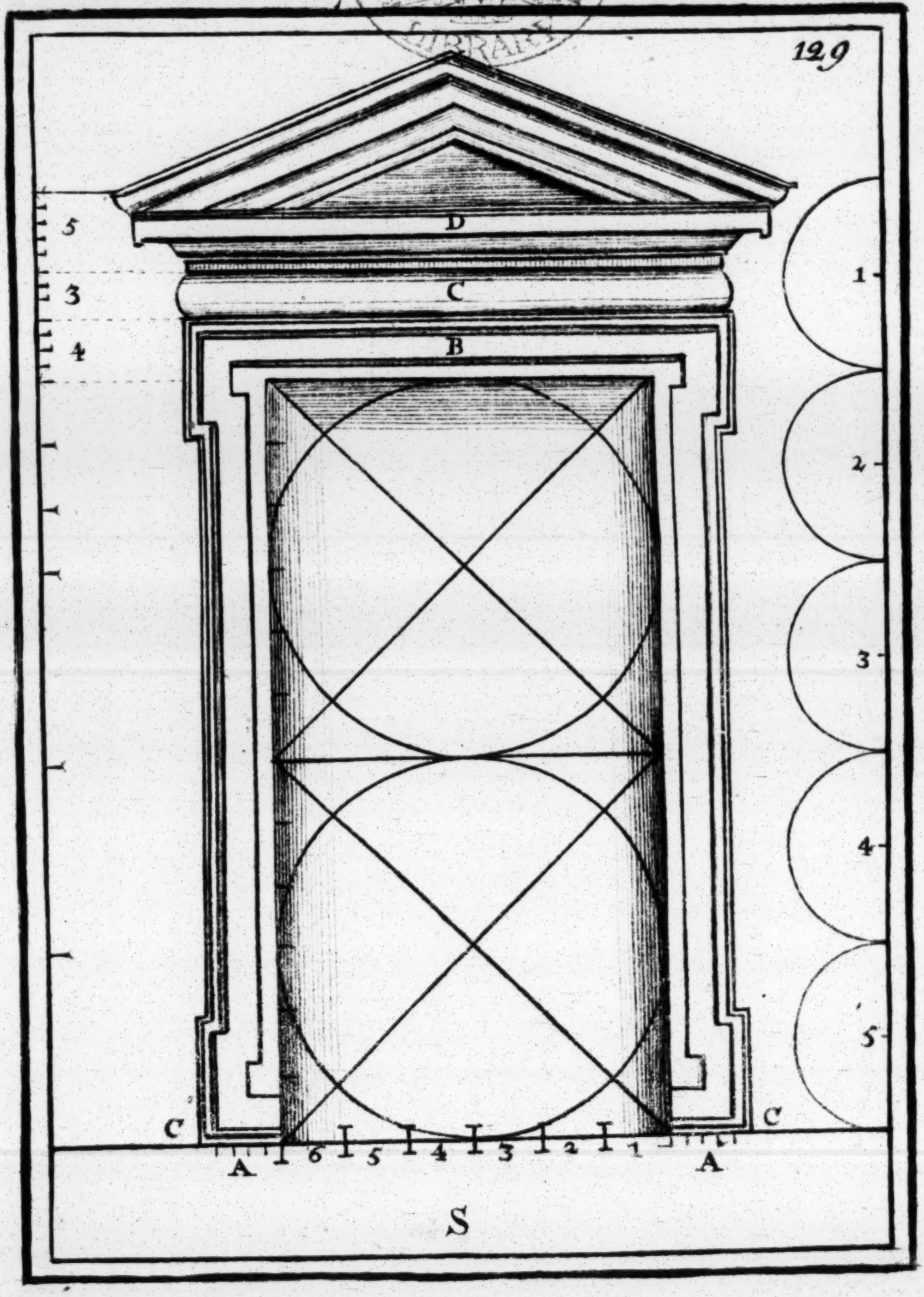
The Ornaments which are given to *Doors* and *Windows*, are the *Architrave*, *Frize*, and *Cornice*.

The *Architrave* turns about the *Door*, and ought to be as Thick as the *Pilaſter*, which (as I have ſaid) ought not to be leſs than the ſixth Part of the Aperture, nor more than a fifth; and from the *Architrave*, the *Frize* and *Cornice* take their Thickneſs, according to the two Inventions which follow.

Example.

Let the Breadth of the Aperture of the *Door* A A be divided into ſix equal Parts, one of the theſe Parts ſhall be the *Architrave* B, which winds about the *Door*, and muſt be divided into four Parts; of three thereof is made the Height of the *Frize* C, and of five that of the *Cornice* D.

The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The Meaſures of each Member of the Ornaments may be found in this Manner:

The *Architrave* B muſt be divided into ten Parts, three muſt be for the *Prima Faſcia* G, four for the ſecond V, and the three which remain muſt be divided into five; three for the *Schima Reverſa* P, and the other two for the *Orlo* or *Regula* R, whoſe *Projecture* is the fourth Part of its Thickneſs; the *Schima Reverſa* P hath in *Projecture* its Height, and is marked in this Manner; They draw a ſtrait Line, which terminates at the end thereof under the *Ovolo*, or *Regular* R, and on the ſecond *Faſcia* V, and is divided in half, ſo as each of theſe Halls is the Baſe of a Triangle of two equal Sides; and on the Angle oppoſed to the Baſe muſt be plac'd the Fix'd Foot of the *Compaſs*; and the *Curve-Lines* muſt be drawn, which make the ſaid *Schima Reverſa* P.

The *Frize* is three Parts of four of the *Architrave*, divided into four, and is deſigned of a portion of a *Circle* leſs than the *Semi-Circle*, the ſwelling whereof comes directly over the *Cymatium* of the *Architrave*.

The five Parts which are given to the *Cornice* diſtribute themſelves in this Manner to its Members, one to the *Scocia* with its *Liſtella*, which is a fifth Part of the ſaid *Scocia*.

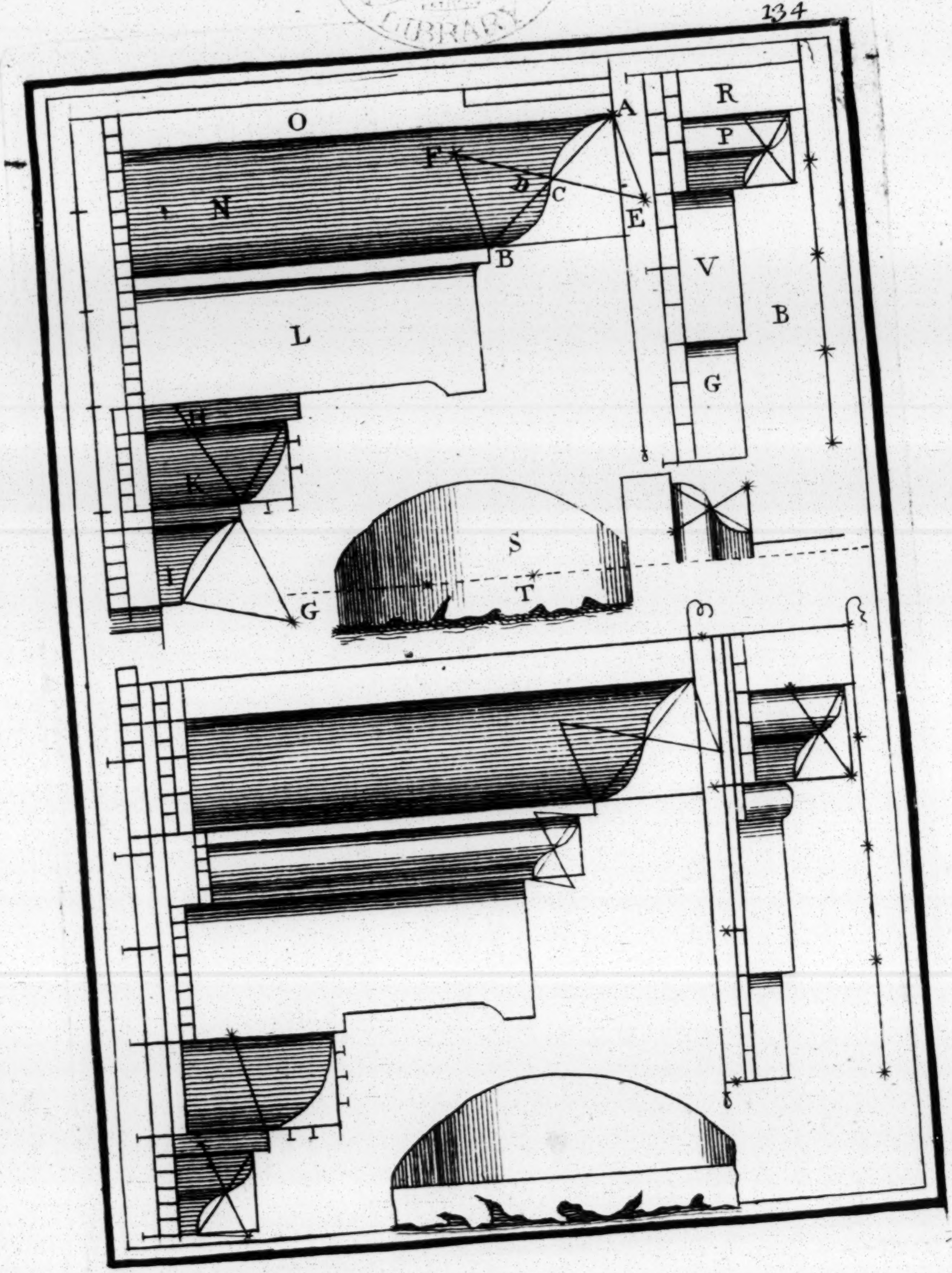
The *Scocia* hath in *Projecture* two thirds of its Height; to deſign it, they form a Triangle of two equal Sides, and to the Angle G they place the Centre, and ſo the *Scocia* becomes the Baſe of the Triangle; another of the ſaid five Parts is for the *Ovolo*, and hath in *Projecture* the two thirds of its Height, and is deſigned making a Triangle of two equal Sides, and the Centre is made at the Point H; the other three Parts are divided again into ſeventeen, eight for the *Corona* with its *Liſts*, of which that above makes one of the eight Parts; and that which is below, and makes the Hollow of the *Corona*, makes one of the ſix Parts of the *Ovolo*: The other nine are for the *Schima Recta*, and its *Orlo* or *Regula*, which is the third of the ſaid *Schima*. To frame it ſo as may be well and graceful, they draw the Right Line A B, and 'tis divided into two equal Parts: At the Point C one of thoſe Parts is divided into ſeven, whereof ſix are taken at the Point D; then they form two Triangles A E C, and C B F, and on the

Points E and F they put the Fix'd Foot of the Compaſs, and draw the portions of the Circles A C and C B, which make the ſaid *Schima.*

The *Architrave* likewiſe in the ſecond Invention, is divided into four Parts; of three is made the Height of the *Frize*, of five that of the *Cornice*; then the *Architrave* is divided into three Parts, two of them are divided again into ſeven; of which ſeven, three are the firſt *Faſcia*, and four for the ſecond; and the third Part of the *Architrave* is divided again into nine Parts; of two is made the *Aſtragal*; the other ſeven are divided into five Parts; three are the *Schima Reverſa*, and two the *Orlo* or *Regula.*

The Height of the *Cornice* is divided again into five Parts and $\frac{1}{4}$; one of which is divided again into ſix Parts; of five is made the *Schima Reverſa* above the *Frize*, and of the ſixth the *Liſtella*; the *Schima Reverſa* hath as much *Projecture* as it is High, and the ſame alſo hath the *Liſtella*; the ſecond Part of the Height of the *Cornice* is for the *Ovolo*, which hath in *Projecture* $\frac{3}{4}$ of its Height. The Moulding above the *Ovolo* is the ſixth Part of the *Ovolo*, and hath the ſame *Projecture*; the other three Parts of the Height of the ſaid *Cornice* are divided into ſeventeen Parts, eight of which are for the *Corona*, which hath in *Projecture* three Parts of four of its Height; the other nine are divided into four Parts, three are for the *Cymatium*, and one for the *Orlo* or *Liſtella*; the $\frac{3}{4}$ which remain are divided into five Parts and half; of one is made the Moulding, and of four $\frac{1}{4}$ the *Schima Reverſa* above the *Corona*: The ſaid *Cornice* hath as much Projecture as it hath Thickneſs.

Members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Members of the *Cornice* of the firſt Invention.

I	*Scocia.*
K	O*volo.*
L	*Corona.*
N	*Cymatium.*
O	*Orlo, orRegula.*

Members of the *Architrave.*

G	*Prima Faſcia.*
V	*Secunda Faſcia.*
P	*Schima Reverſa.*
R	*Orlo, or Regula.*
S	*Swelling of the Frize.*
T	*Part of the Frize which enters into the Wall.*

By the Means of theſe Two, you may know the Members of the ſecond Invention.

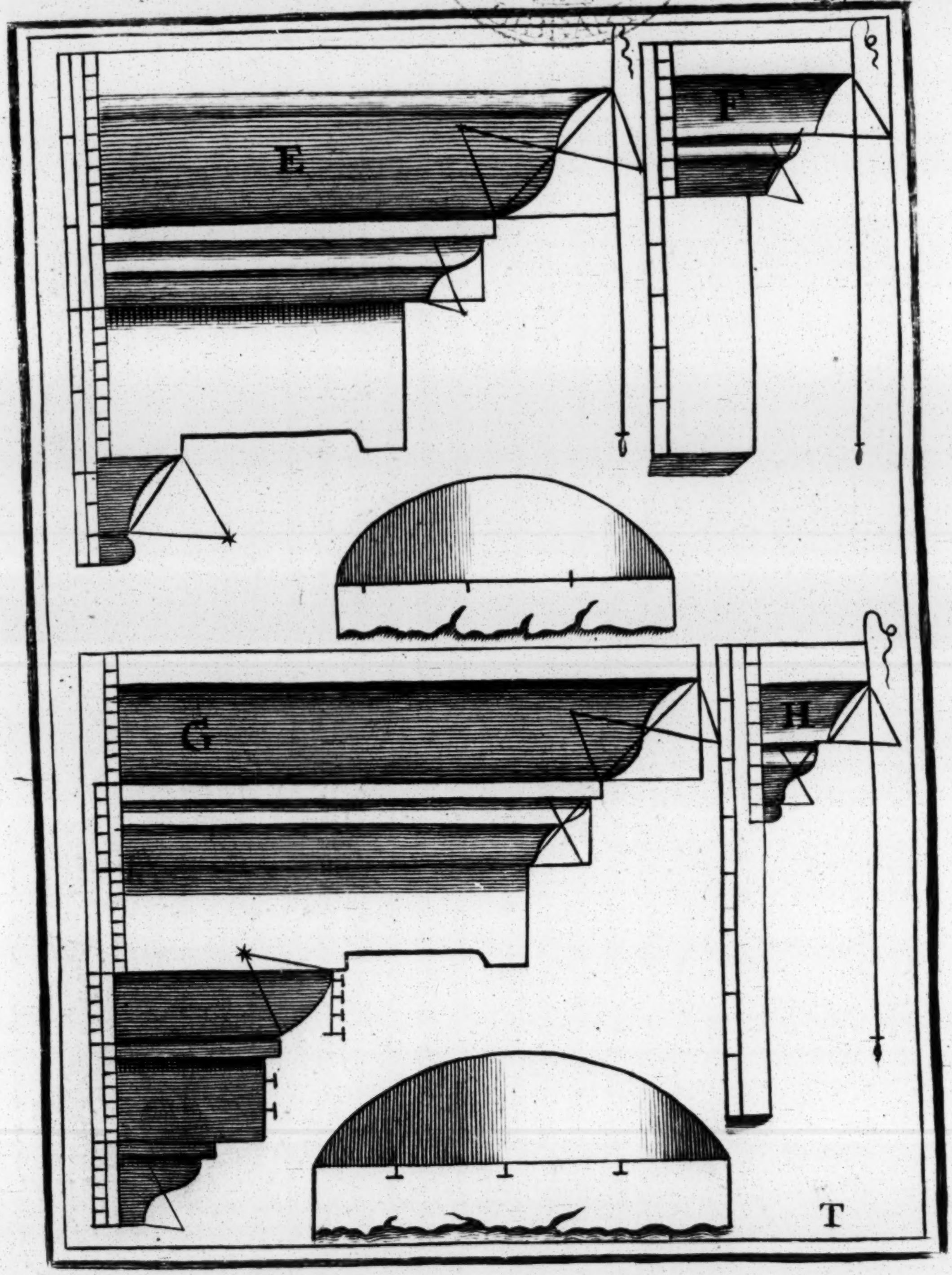
Of theſe two other Inventions, the *Architrave* of the firſt, which is marked F, is likewiſe divided into four Parts, of three and $\frac{1}{4}$ is made the Height of the *Frize*, and of five that of the *Cornice* ; the *Architrave* is divided into eight Parts, five are for the Plain of the *Architrave*, and three are for the *Cymatium*, which is divided again into eight Parts, three for the *Schima Reverſa*, three for the *Scocia*, and two for the *Orlo* or *Regula* : The Height of the *Cornice* is divided into ſix Parts, of two is made the *Schima Recta*, with its *Orlo* or *Regula*, and of another the *Schima Reverſa* ; the ſaid *Schima Recta* is divided again into nine Parts, of eight thereof are made the *Corona* and Moulding ; the *Aſtragal*, or *Rondeau* above the *Frize*, is a third of one of the ſaid ſix Parts, and that which remains between the *Corona* and the *Aſtragal* is left for the *Scocia*.

In the other Invention, the *Architrave* marked H is divided into four Parts, and of three and half is made the Height of the *Frize*, and five the Height of the *Cornice* : The *Architrave* is divided into eight Parts, five of them are for the Plain of the *Architrave*, and three are for the *Cymatium*, which is divided into ſeven Parts ; of one is made the *Aſtragal*, and the reſt are divided into eight Parts ; three of which are for the *Schima Reverſa*, three for the *Scocia*, and two for the *Orlo* or *Regula* ; the Height of the *Cornice* is divided into ſix Parts and $\frac{3}{4}$, of three are made the *Schima Reverſa*, the *Dentils* and *Ovolo* ; the *Schima Reverſa* hath as much *Projecture* as it is Thick : The *Dentils* are two of three Parts of their Height, and the *Ovolo* three of four Parts. Of the $\frac{3}{4}$ is made the *Schima Reverſa*, between the *Schima Recta* and the *Corona* ; and the three other Parts are divided into ſeventeen ; nine make the *Schima Recta*, and the *Orlo* or *Regula*, and eight the *Corona*.

This *Cornice* hath as much *Projecture* as it hath Thickneſs, as all the other aforeſaid.

☞ *Here follow Deſigns of* Doors *and* Windows, *according to the five Orders of* Andrea Palladio, *and are the ſame which are in the* Louvre *in* Paris.

CHAP.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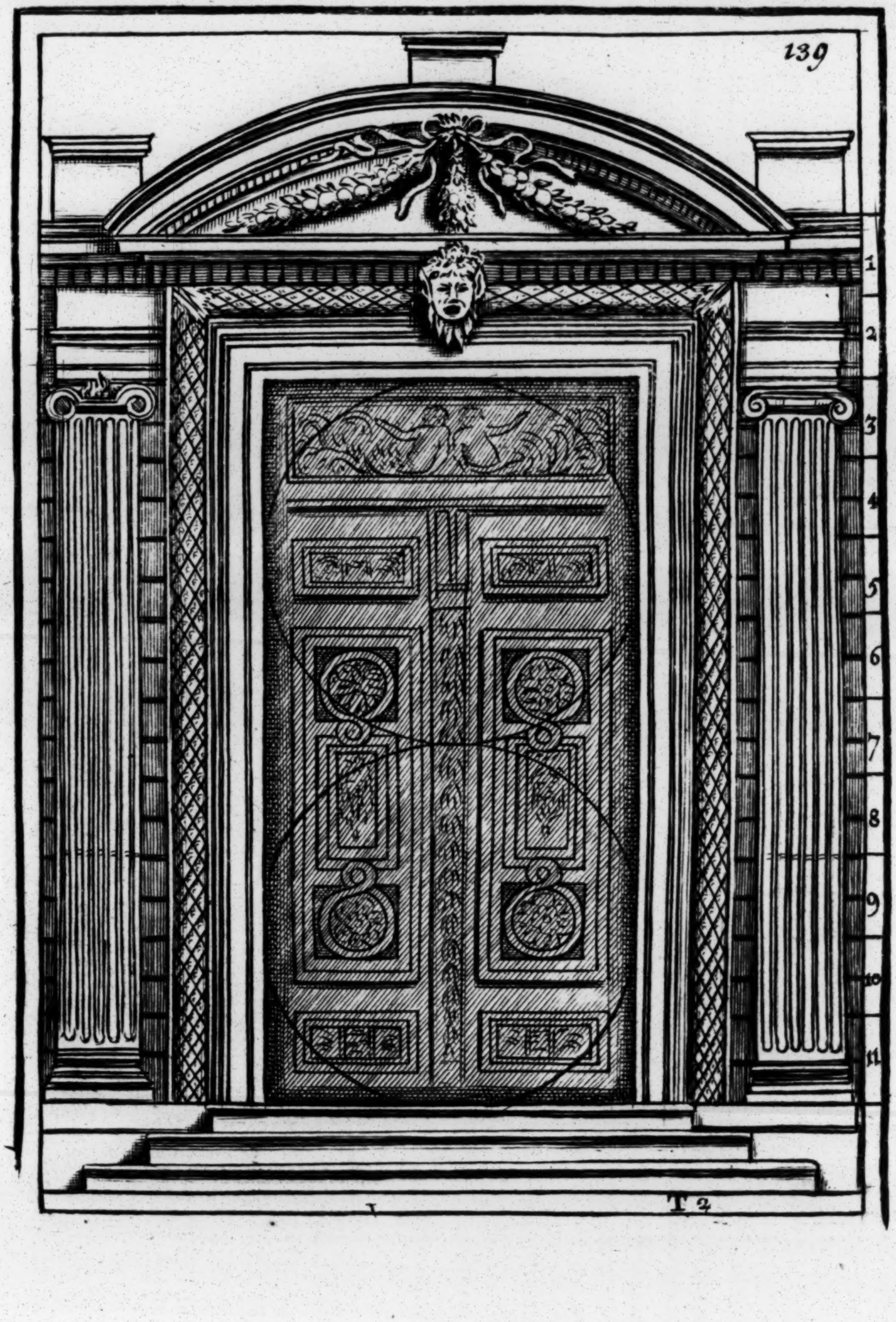
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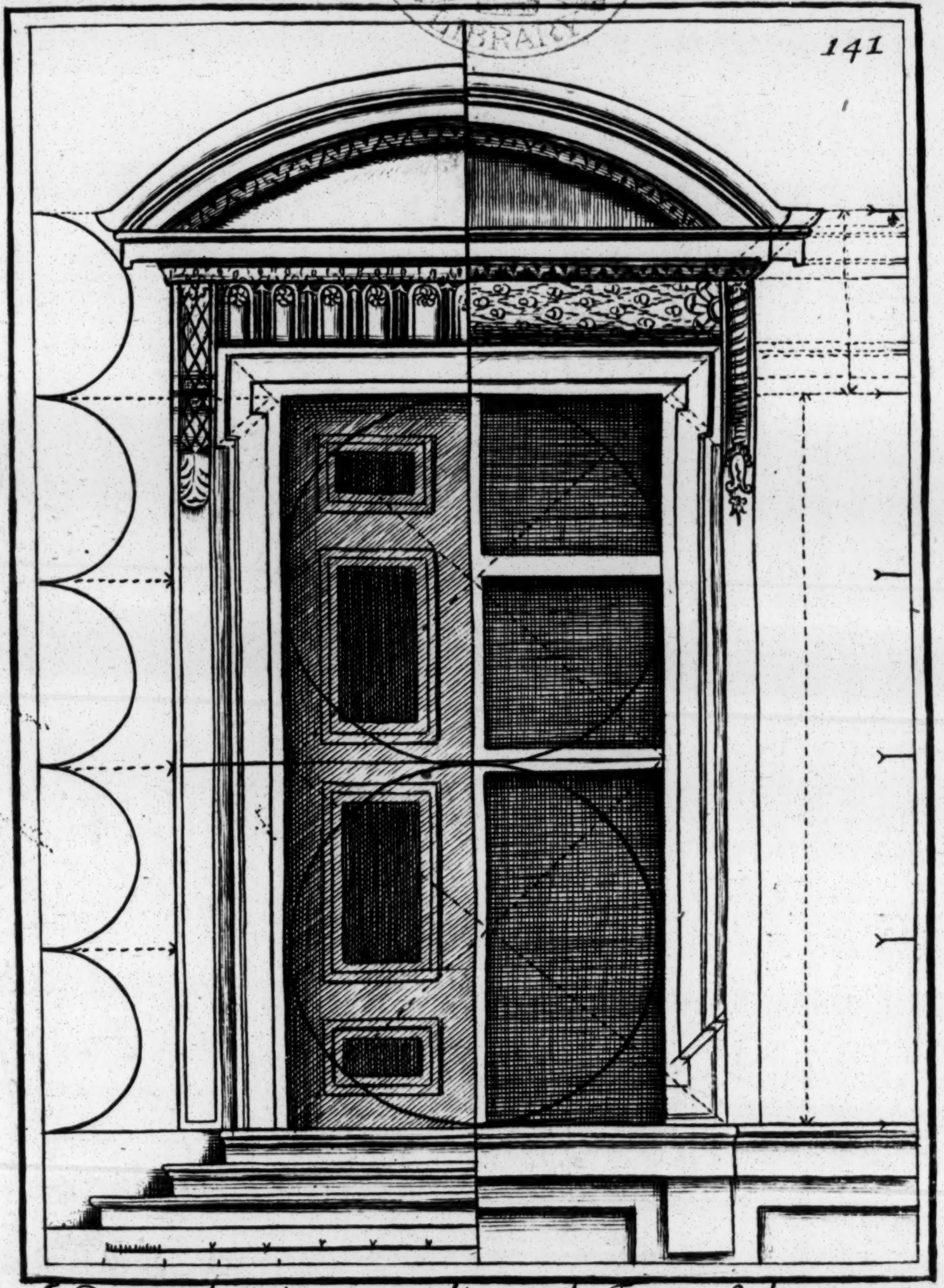
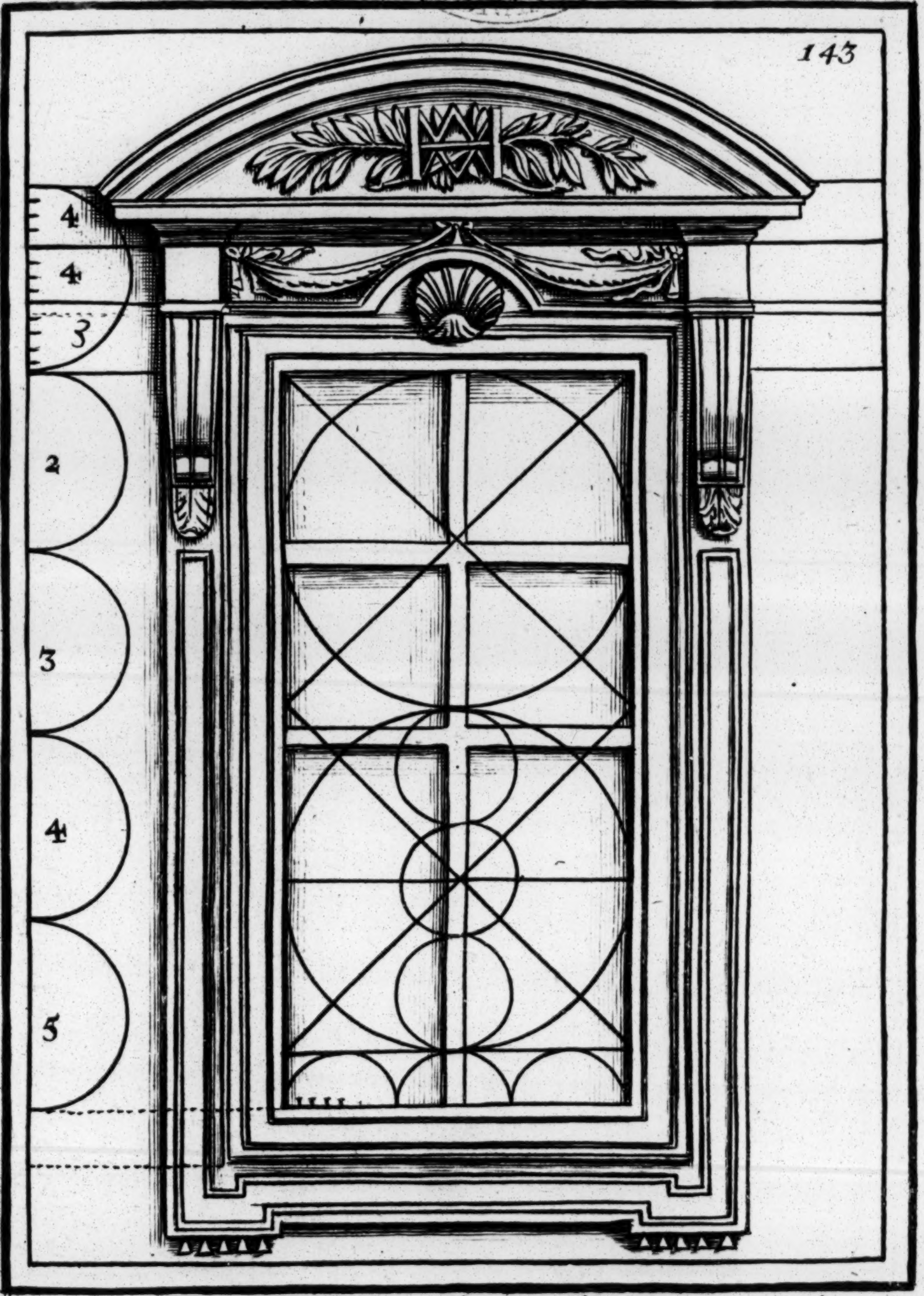
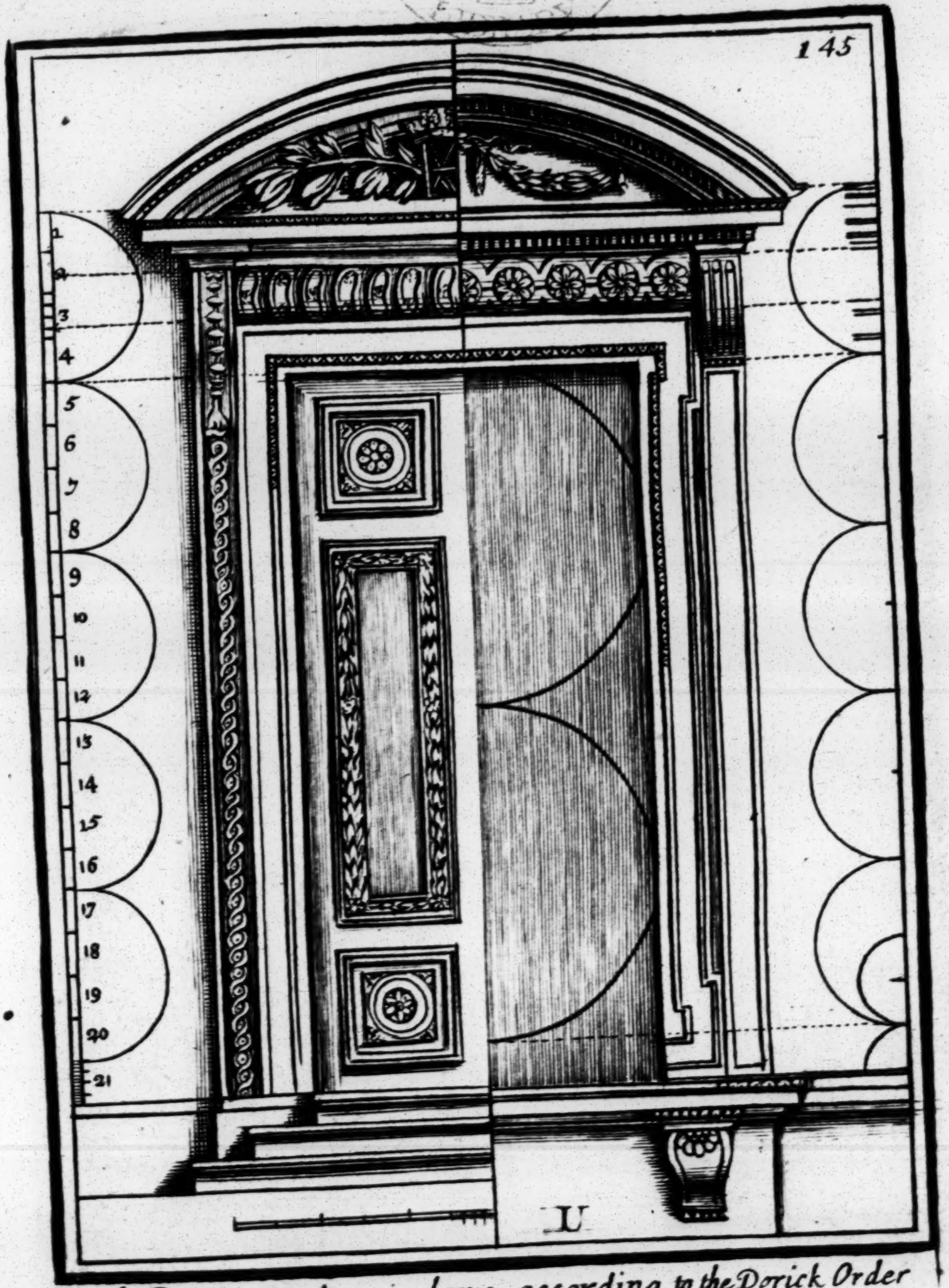


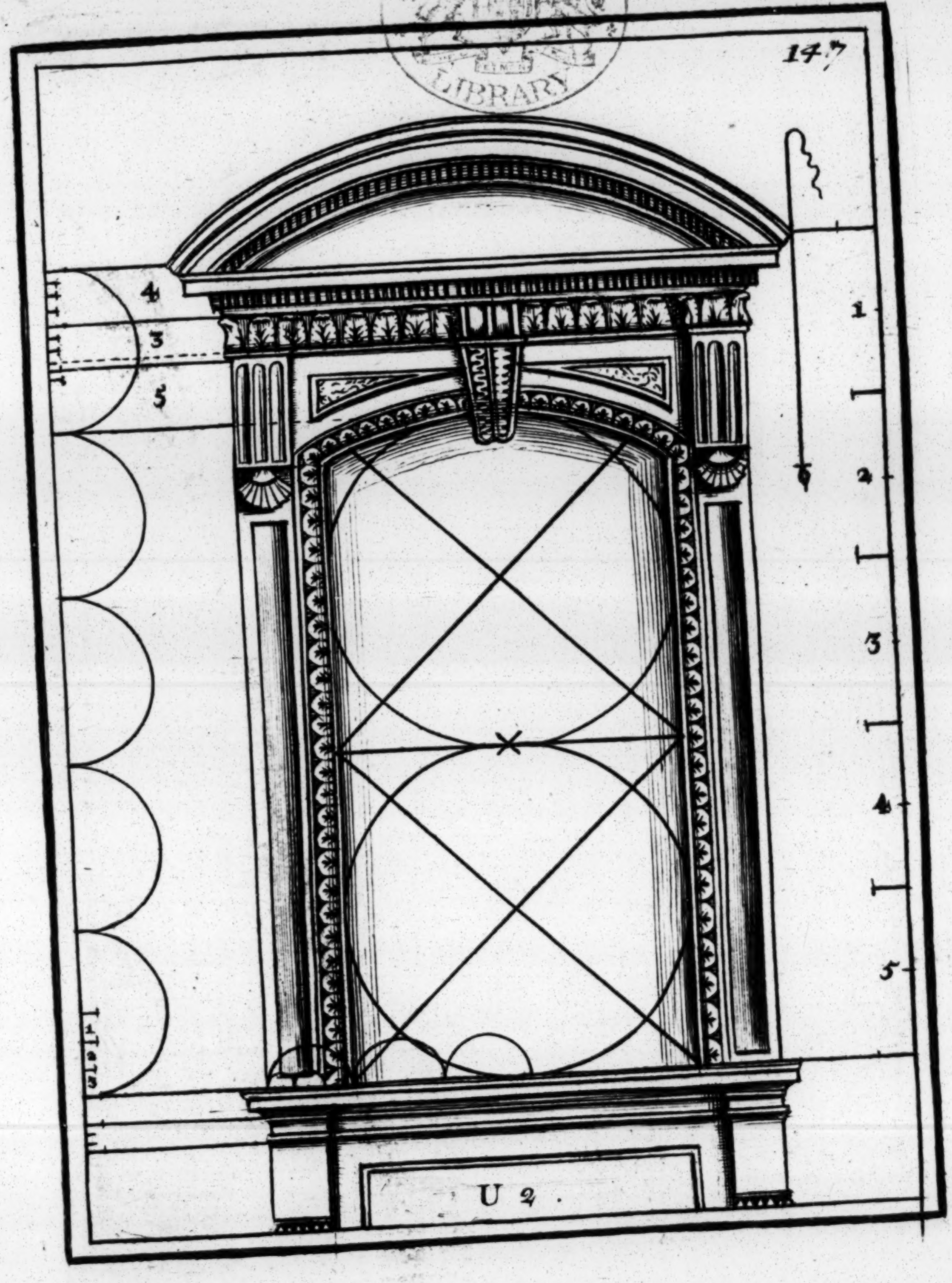
A Doore and windowe according to the Tuscan Order

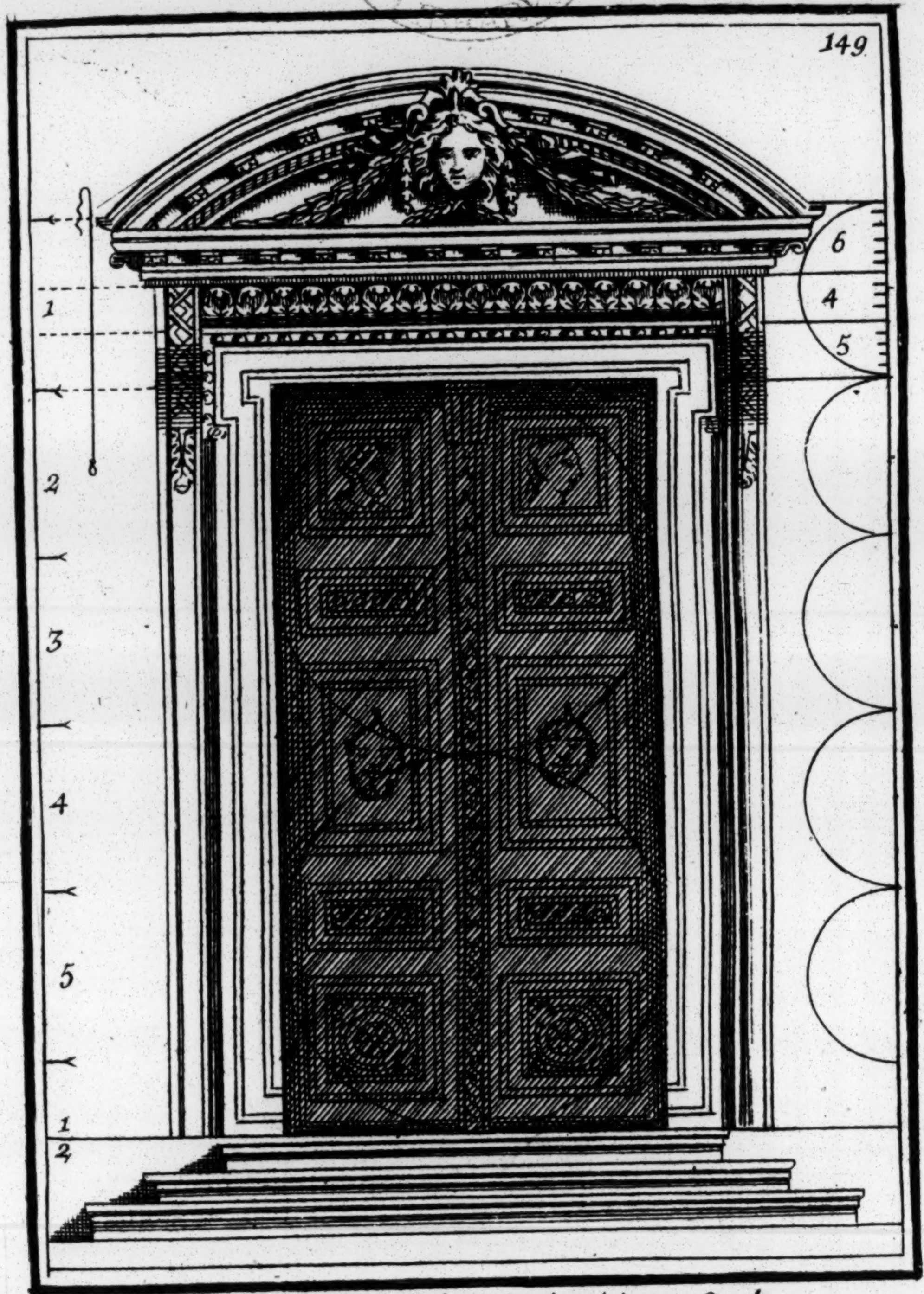


A Doore and windowe according to the Dorick Order

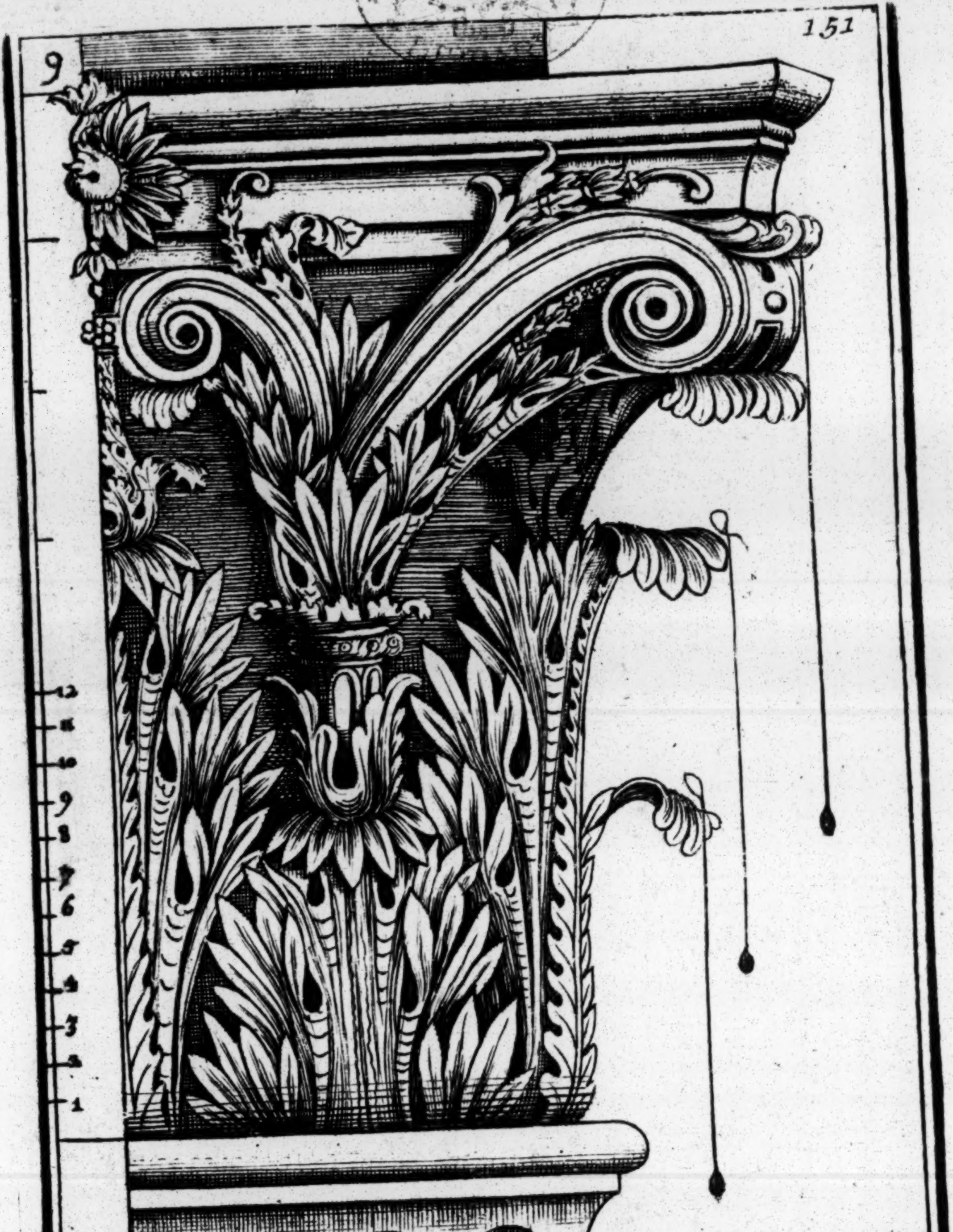


A Doore and windowe according to the Dorick Order

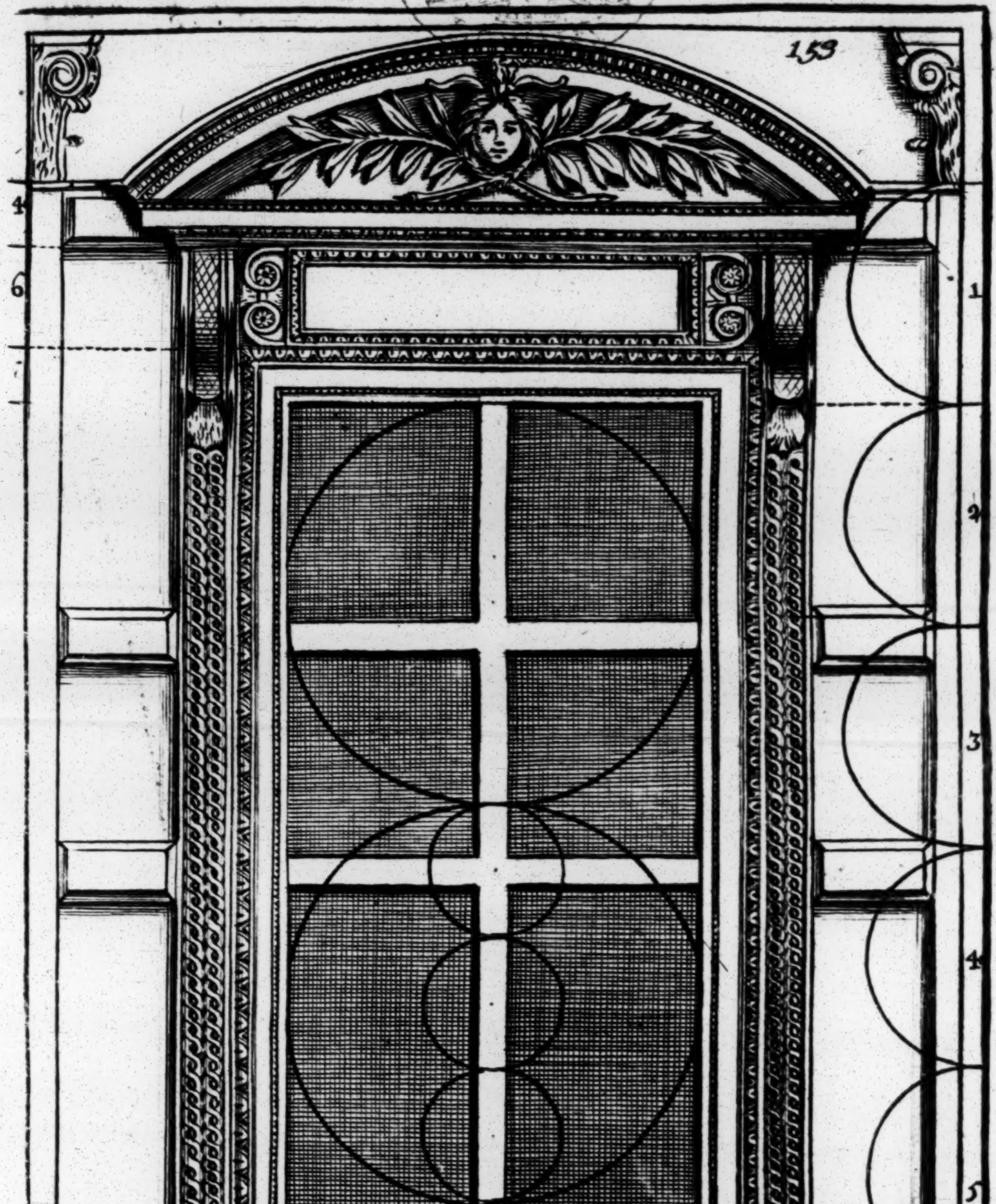




A Door according to the Corinthian Order



The Corinthian Capital



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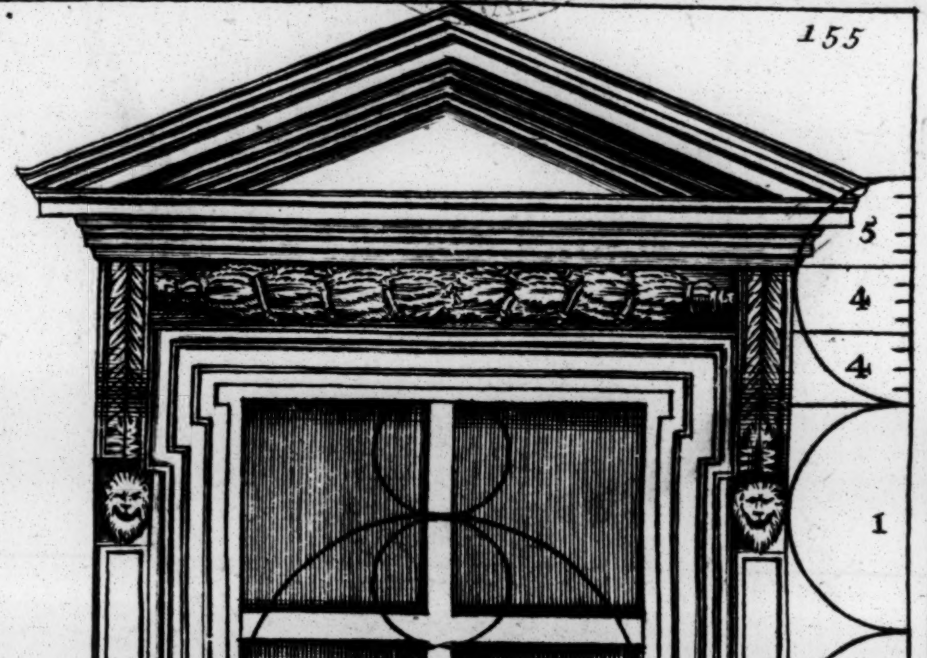

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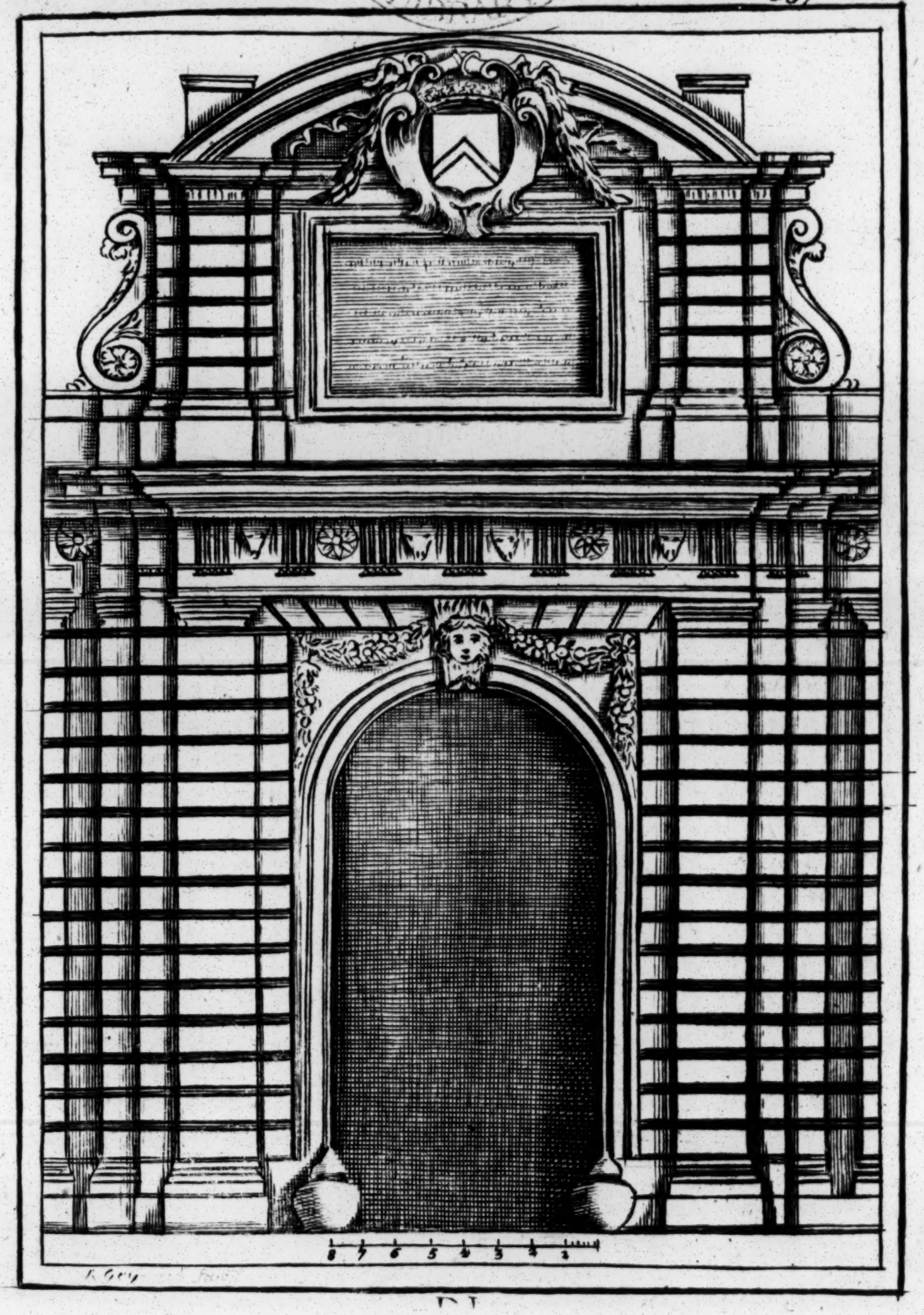
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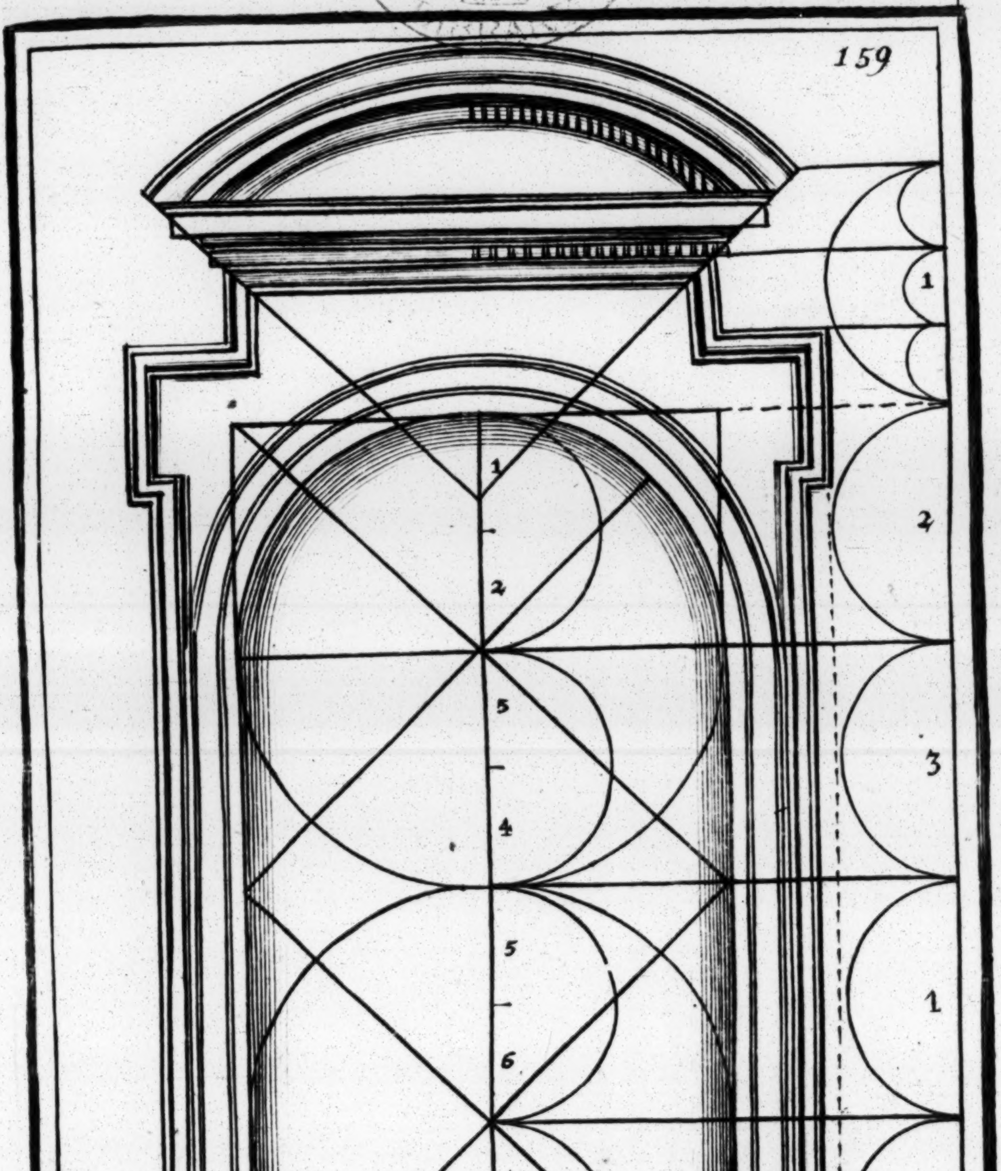

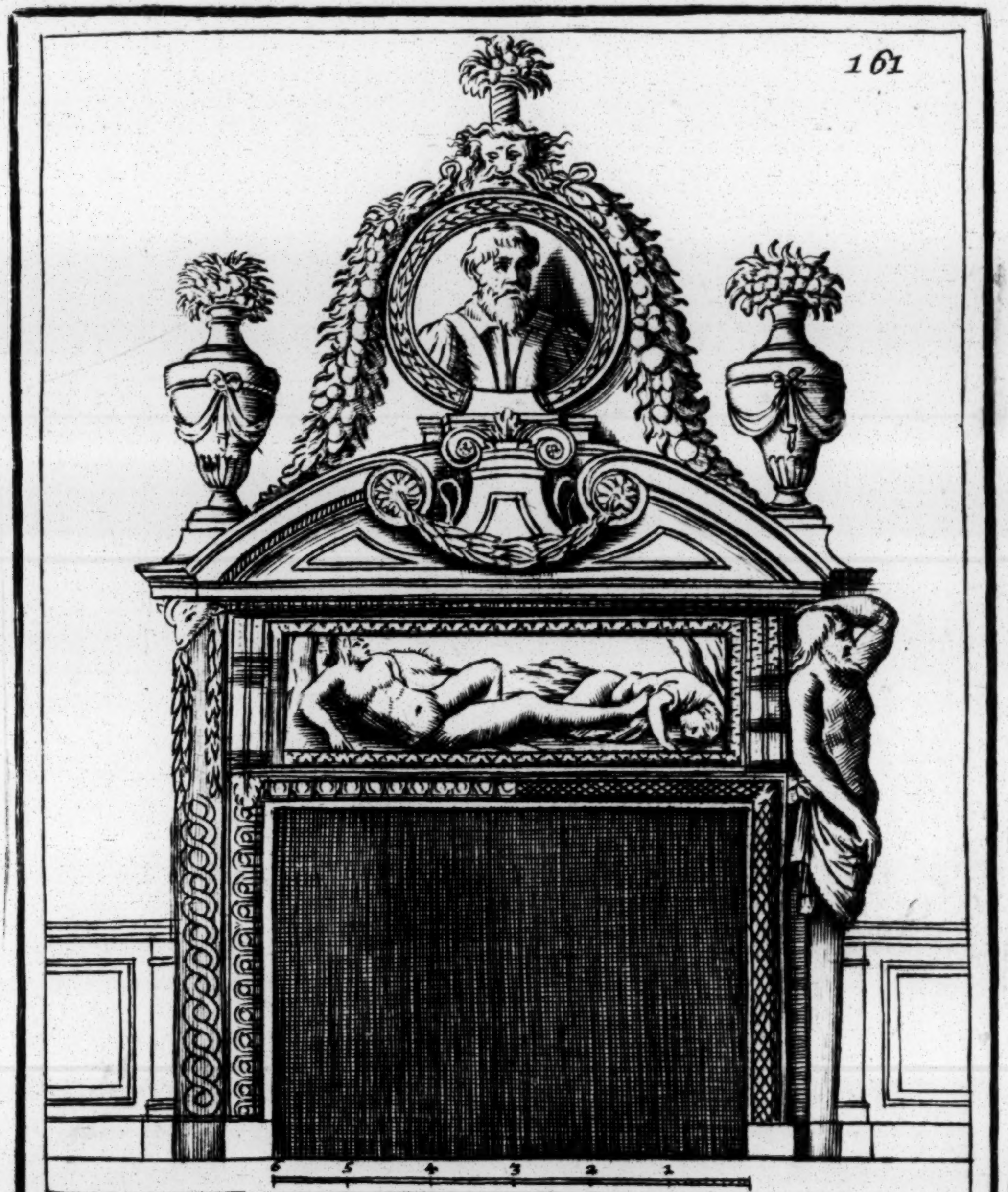
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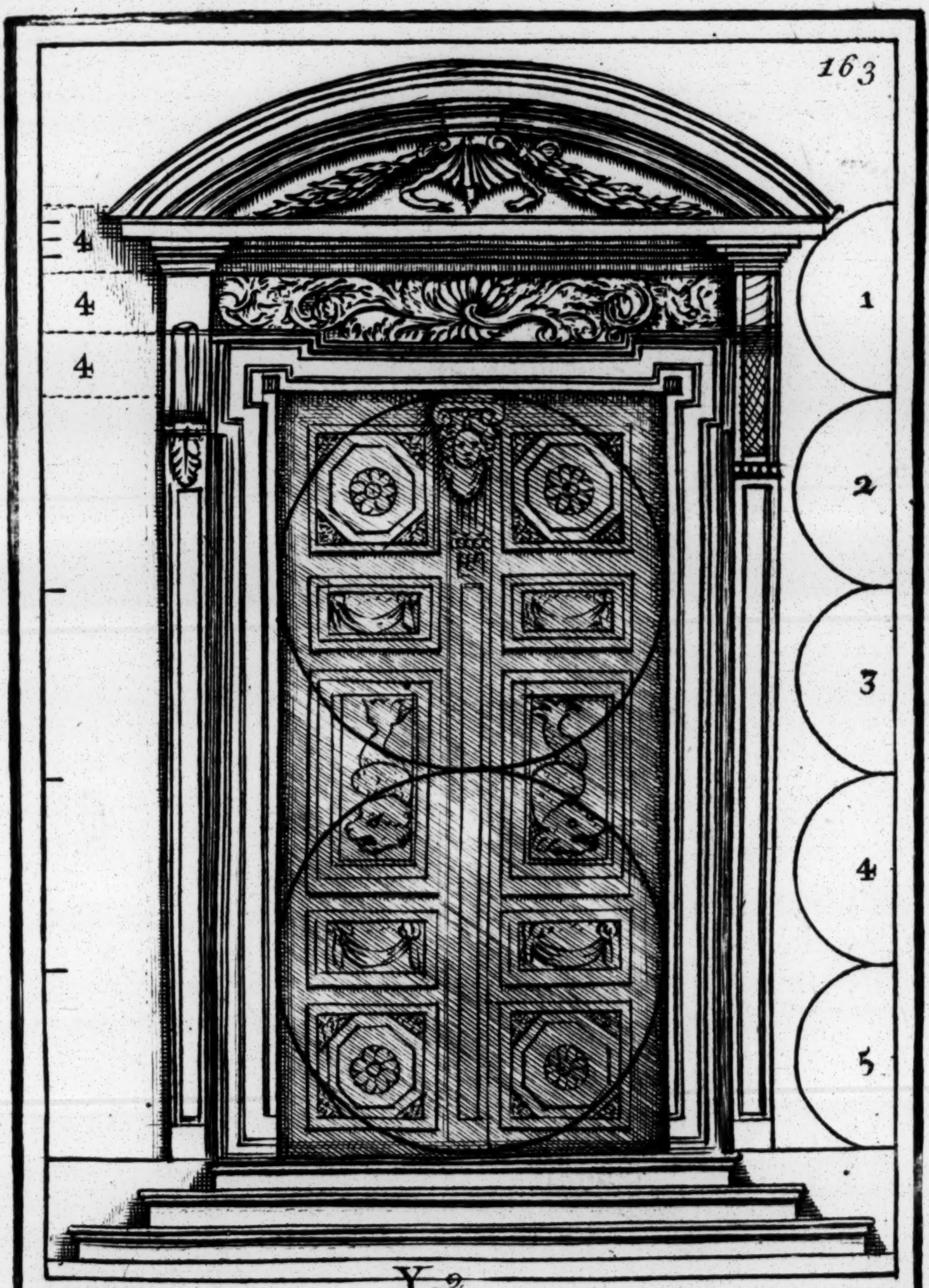


CHAP. XXXVIII.

Of Chimneys *in* Halls, Chambers, Studies, *and* Wardrobes, *and of their Proportions.*

H*All-Chimneys* ought to be within Work ſix or ſeven Foot, and in great Buildings unto eight, between the two Jaums: And 'twill be convenient to make their *Funnels* in the Thickneſs of the Wall, if poſſibly it can; if not, they muſt be ſet in a Place where they may correſpond to thoſe of the *Chambers*, the which ſpreads it ſelf but little in the Middle, (as it hath been ſaid;) and if it be poſſible, it muſt be ſo diſpoſed, that the *Chimney* be ſeen in the Front by them that ſhall enter into the *Hall.*

Their Height muſt be four Foot and ½, to five at moſt, from the bottom of the Plate-band to the Mantle-tree; they muſt project two Foot and a half, or three Foot at moſt, from the Wall unto the Mantle-tree. The Jaums muſt be from eight to twelve Inches in Breadth; and in great Buildings, ev'n to twenty four, or more, according to that Order of *Architecture* with which they are to be adorned.

* * *

CHAP. *XXXIX.*

Of Chamber-Chimneys, *and of their Proportions.*

C*Hamber-Chimneys* muſt have in Breadth five and $_2$, or ſix Foot, and in great Buildings unto ſeven, and muſt be placed as I have ſaid before, becauſe of the Place for the Bed. Their Height muſt be four Foot, or 4 and half from the Mantle-tree or Plate-

Plate-band, their *Projecture* muſt be two Foot, or two and an half, from the Back to the Foreſides of the Jaums.

CHAP. XL.

Of the Chimneys in Studies and Wardrobes.

CHimneys in theſe Rooms muſt be four Foot, four and a half, or five Foot at moſt in Breadth: Their Height from the Mantle-tree muſt be like to that above of four Foot and a half, and alſo their *Projecture* two Foot, or two and a half, from the Back.

CHAP. XLI.

Of the Funnels of Chimneys.

FUnnels of *Chimneys* muſt be carry'd through the Roof, and above the Ridge, three Foot, four, or five Foot at moſt, that they may carry the Smoke into the Air. You muſt take care that they be made neither too wide nor too narrow; for if they be too wide, the Wind will drive back the Smoke into the Room, and will not permit it freely to aſcend and paſs forth; and in *Funnels* too narrow, the Smoke not having free paſſage, is repulſed, and returns backwards: Therefore 'tis that *Chamber-Chimneys* are not made narrower than ten or eleven Inches, nor broader than fifteen, which is the ordinary Depth of *Funnels* of great Kitchin-Chimneys, by reaſon of the great Fire that is made therein: And for their Breadth, they muſt be four or five Foot at moſt within the Work, from the Place where the Breaſt ends, unto the Top of the *Funnel*. Now the ſaid Breaſt reacheth from the Mantle-tree unto the Ceiling or Pitch of the Arch, always diminiſhing within the Work, until you come to the Meaſures of Depth and Breadth before mentioned; and from thence ariſing unto the end of the *Funnel*, it muſt be carried up as even as you can poſſibly; for failing in this, it often happens the Smoke is offenſive.

CHAP. XLII.

What is to be obſerved in making Chimneys, *and the Faſhion which was practiſed among the Antients.*

THE *Jaums* and *Mantle-trees* of *Chimneys* muſt be curiouſly wrought; for ruſtick Work doth not appear well, unleſs it be in very great Buildings, for the Reaſons aforeſaid.

The Antients, to heat their Chambers, did ſerve them in this Manner: They made their *Chimneys* in the middle with Columns or *Corbeaux* which bore up the *Architrave*, upon which were the *Funnels* of the *Chimneys* which convey'd away the Smoke; of which kind, one may be ſeen at *Bay* near the *Piſcine* of *Nero*, and one which is not far from *Civita Vecchia*; and when they would not have *Chimneys*, they made in the Thickneſs of the Wall Pipes or Funnels, through which aſcended the Heat of the Fire which was under the *Chamber*, and was conveyed forth through certain Vents and Conducts which were on the top of Funnels. Much like this the *Trenti* Gentlemen of *Venice*, in the Summer, refreſhed their *Chamber*, at *Coſtoza*, their Country-dwelling: For in that Place there are great Mountains in which are certain great Caves, which in Times paſt were Quarries, which (I ſuppoſe) *Vitruvius* means, in his Second Book, where he treats of *Stone*. In theſe Caves are ingendred extreme cool Winds, which theſe Gentlemen cauſed to be brought into their Houſes through certain *Subterranean* Vaults, and by the means of certain Trunks, like to thoſe whereof I have ſpoken before, make them run through all the *Chambers*, opening and ſhutting them at pleaſure, to take more or leſs of Air, according to the Time and Seaſon; and this Place would be wonderful, were it only for this great Commodity; nevertheleſs, that which renders it yet more admirable and worthy to be ſeen, is, the *Priſon of the Wind*, which is a certain *Chamber* under Ground, made by the Moſt Noble Seignieur *Trenti*, and by him call'd *Æloa*, where many of thoſe Trunks and Conducts of Wind are diſcharged: And to render it beautiful and worthy of this Name he hath given it, he hath ſpared neither Care nor Charge.

CHAP. XLIII.

Of Stair-Caſes, *and their divers Manners, and the Numbers and Greatneſs of their* Steps.

THere ought to be great Care taken in the well placing the *Stair-Caſe*; for there is not a little Difficulty to find a Place convenient, ſo as the *Stairs* may be diſtributed without Prejudice or Hindrance to the reſt of the Building; 'tis therefore that ordinarily they are placed in the Corner of the Building, or on the Wings, or in the middle of the Front, which is but ſeldom, unleſs it be in great Buildings; becauſe much of the Stone-work will be hindred by reaſon of the *Stairs* being in the middle, unleſs the Houſe be Double.

There are three Openings neceſſary to the leaſt *Stair-Caſe*; the firſt, is the Door-way that leads to them, which is the better when it is ſpacious, and pleaſeth me moſt, if it be in ſuch a Place, where, before one approacheth, one may ſee the beſt Part of the Houſe: For altho' the Houſe be little, by this means it appeareth much larger; nevertheleſs, it behoves that the ſaid Door-way be obvious, and eaſy to be found.

The

The ſecond Opening, is that of the *Windows*, which are needful to give Light to the *Stairs*; and when there is but one, let it be in the middle as near as you can, to the end that all the *Stair-Caſe* may be enlightned.

The third Opening, is the Landing-place, by which we are to enter into the Roms above, and ought to lead to Places large, fair, and well adorned.

Stairs will be well made, if they be ſpacious, light, and eaſy, ſo as they may invite People to go up.

They will be lightſome, when they have a perfect Light that diſperſeth it ſelf to all Parts equally.

They are ſpacious when they appear not little, nor narrow, in reſpect of the bigneſs and quality of the Fabrick; but they muſt never be narrower than four Foot, to the end that if two Perſons meet, they may commodiouſly paſs one by the other; they may be made of five or ſix Foot, or ſeven and a half, and to great Buildings unto ten or twelve Foot broad to every Flight, and they muſt be made as commodious as poſſibly you can.

CHAP. XLIV.

Of the Height and Breadth of Steps.

THE *Steps* ought not to be more than 6 Inches high; and if they be lower, they muſt chiefly be to long and continued *Stairs*; they will be ſo much the eaſier, becauſe one needs not lift the Foot ſo high; but they muſt never be lower than four Inches.

Their Breadth ought not to be leſs than a Foot, nor more than fifteen or ſixteen Inches.

Antients obſerved, not to make the Number of *Steps* even, to the end that beginning to aſcend with the Right Foot, they might end with the ſame Foot, which they took to be a good *Omen*, and with greater Devotion ſo to enter into the Temples.

CHAP. XLV.

Of divers Manners of Stairs.

Stairs are made Straight, or Winding: The Straight are made ſpread abroad into two Branches or Paſſages; or Square, which turns into four Branches or Paſſages; and to make them in this laſt Manner, all the Space muſt be divided into four Parts, whereof two muſt be for the *Stairs*, and two for the Vacancy; by the middle whereof, if it be open the *Stairs* receive Light. They may be made with a Wall within; and then within the two Parts which are taken for the *Stairs*, the Thickneſs of the Wall ought to be comprehended and incloſed, which makes the *Caſe* or *Newel*; they may alſo be made without a Wall within. Theſe two ſorts of *Stairs* were made by the Invention of Seignor *Lovis Cornaro*, a Gentleman of excellent Judgment.

Winding-Stairs, ſome are made Round, ſome Oval, ſome with a *Newel* in the Middle, and ſome open; and ſuch *Winding-Stairs* are made chiefly where there is little room, becauſe they take up leſs room than the *Straight-Stairs*, yet not ſo eaſy to aſcend. Thoſe which are Open in the Middle are very handſome, becauſe they may have Light from above; and thoſe who are above, may ſee thoſe who are coming up, and are ſeen alſo by them.

Thoſe which have a *Newel* in the middle, having but little room, are made in this Manner: You muſt divide the Diameter into twelve Parts, ten whereof are for the *Stairs*, and the two which remain are for the *Newel* in the middle; or divide the ſaid Diameter into eight Parts, ſix whereof are for the *Steps*, and two for the *Newel*; and if there be much room, you muſt divide the Diameter into three Parts, whereof two are for the *Stairs*, and one for the *Newel*, as in the Deſign A; or otherwiſe you may divide the Diameter into ſeven Parts, of which take three for the *Newel* in the middle, and four for the *Stairs*. Juſt in this Manner is the *Stair-Caſe* of the Column of *Trajan* at *Rome*; and if you make *Stairs* Winding, as in the Deſign B,

they

they will be handſomer and, more agreeable, and longer than if they had been ſtraight; but to *Stair-Caſes* Open in the Middle, the Diameter muſt be divided into four Parts, two whereof muſt be for the Middle, and two for the *Stairs*.

Beſides the Faſhion of *Stairs* which are in Practice, there hath been a *Winding-Stair*, invented by *Mark-Anthony Barbaro*, a Gentleman of *Venice*, of excellent Judgment, who made excellent Experiments in very narrow Places, where there is no *Newel* in the middle; and the *Stairs* in their Turning are much longer, and are divided after the Manner aforeſaid.

Thoſe which are Oval are divided in the ſame manner as the Round; they are very handſome and pleaſant, becauſe all the *Windows* and *Doors* are in the middle and head of the Oval, and are very commodious. I have made one Open in the Middle in the Monaſtery of *Charity* at *Venice*, which hath ſucceeded very well.

There is another very handſome manner of *Stairs*, which King *Francis* the Firſt cauſed to be made in the Caſtle of *Chambor* near *Bloyſe*, and is in this manner: There are four *Stair-Caſes* which have four Entrances, to wit, one Entry to each, and go up the one over the other in ſuch manner, that being made in the middle of the Building, the four may ſerve for four Apartments, ſo that the Inhabitants of one need not go up and down the *Stairs* of the other; and becauſe it is open in the middle, they all ſee each other go up and down, without any hindrance the one to the other. This Invention being new and handſome, I have placed it here, and marked with Letters from the Foot to the Head, to the end every one may ſee where each *Stair* begins, and where it ends.

There were alſo the *Portico's* of *Pompey* at *Rome*, leading to the Place of the *Jews*, *Winding-Stairs* of an admirable Form; for being placed in the Middle, in ſuch manner that they could not receive Light but from on high, they were ſet upon Columns, to the end that the Light might diſtribute it ſelf to all Parts alike; according to which Example, *Branante*, an excellent Architect in his Time, made one of them at *Belvedere*, and without *Steps*, having the four Orders of Architecture, *Dorick*, *Ionick*, *Corinthian*, and *Compoſita*. To make theſe *Stair-Caſes*, you muſt divide

vide the whole Space into four Parts, two whereof are for the void Place in the Middle, and one on each ſide of the *Steps* and Columns.

There are many other Faſhions of *Stair-Caſes* in ancient Edificies, as *Triangulars*; and of this ſort are thoſe of the Cupolo of St. *Maria Rotunda*, which are open in the middle, end receive Light from above: Thoſe alſo which are at *Sancto Apoſtolo* in the ſame City, by which we go to *Mount Cavello*, which are very magnifick, and they are Double. Many Perſons have taken the Model thereof, and carried it to a Temple on the top of the Mountain, (as appears in my Book of *Temples*;) and of this ſort is this laſt Deſign.

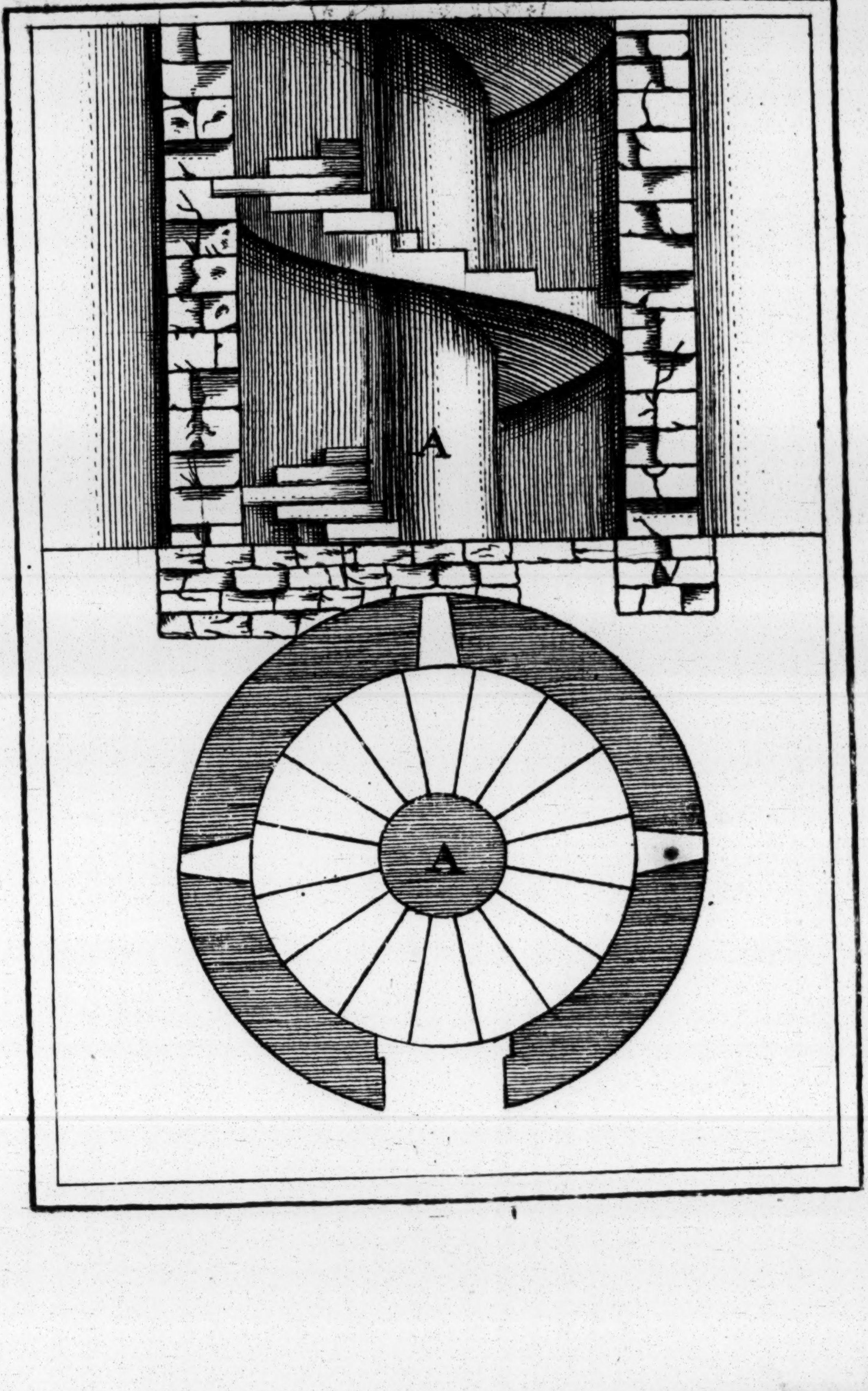
You muſt note, that in *Stair-Caſes* which are ſquare or oblong, when you are conſtrained to place *Steps* in the Angles, in turning you cannot make more than ſix in a Semi-circle, which are three in ¼ of a Circle, and is then when the *Stair-Caſe* ſhall have but ſix or ſeven Foot in Breadth within Work, which is the leaſt that can be made.

To *Stair-Caſes* of eight Foot broad, you muſt put eight *Steps* from the Angle, turning to a Semi-circle, which will be Four to ¼ of a Circle.

And to *Stair-Caſes* from nine to ten Foot broad, you muſt put ten *Steps* to a Semi-circle.

If they have eighteen Foot, more or leſs, you may make twelve *Steps* to a Semi-circle.

You muſt take heed that the Landing-place of the *Stairs*, which is the Space between the Wall and the *Steps* which one aſcendeth, and which doth diſtribute to the Apartment, be broader a fourth Part at leaſt than the Length of the ſaid *Steps*.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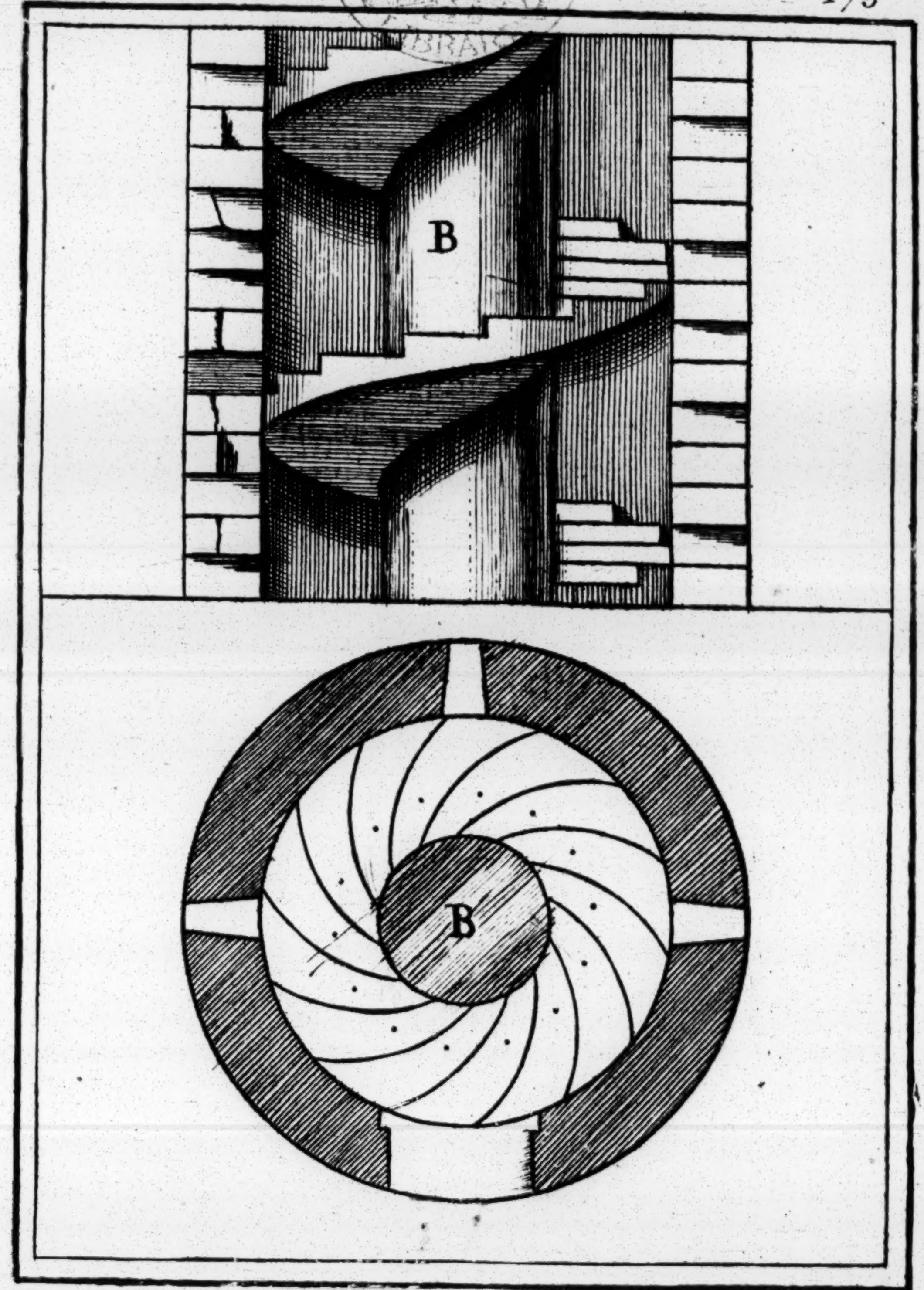
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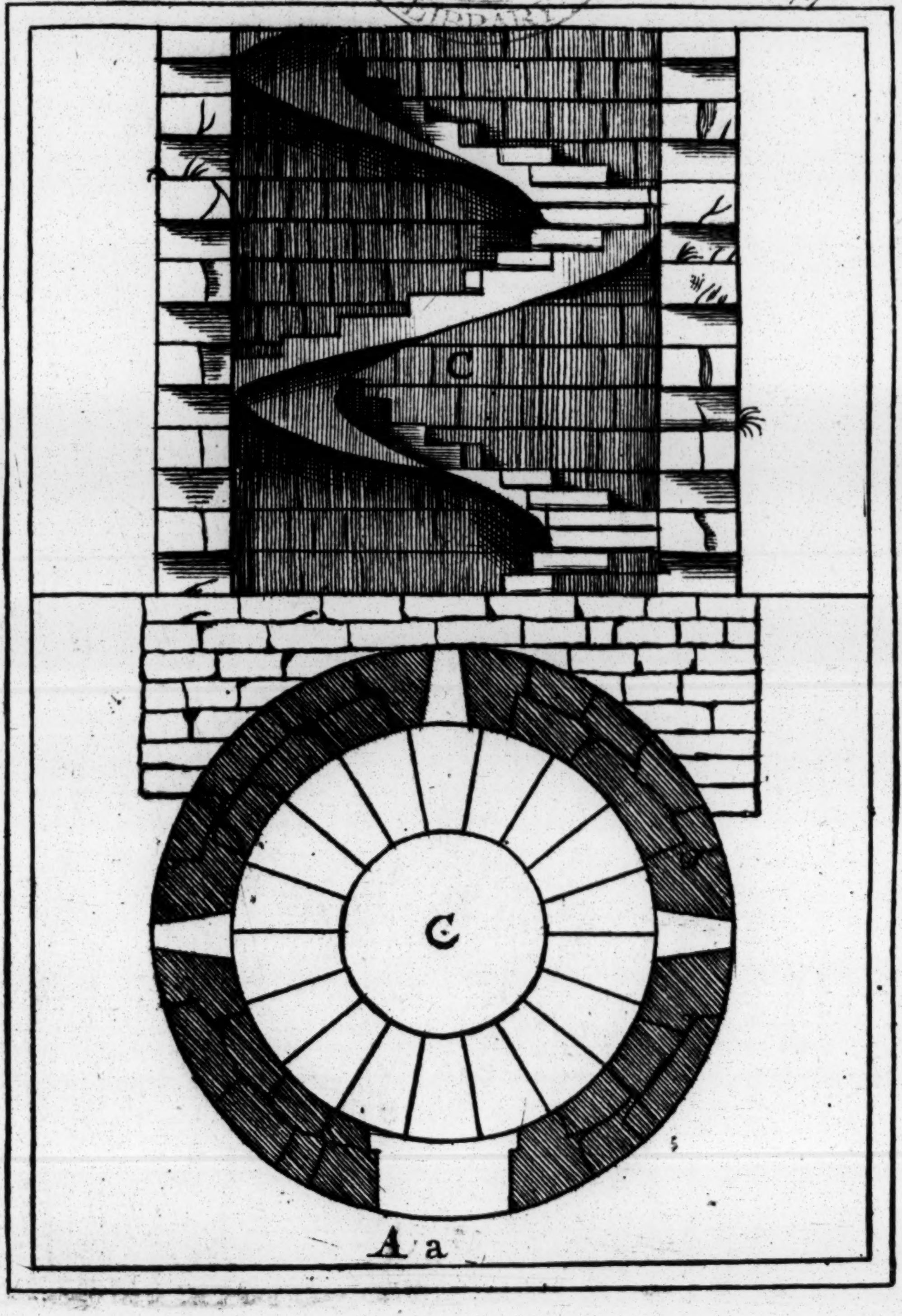

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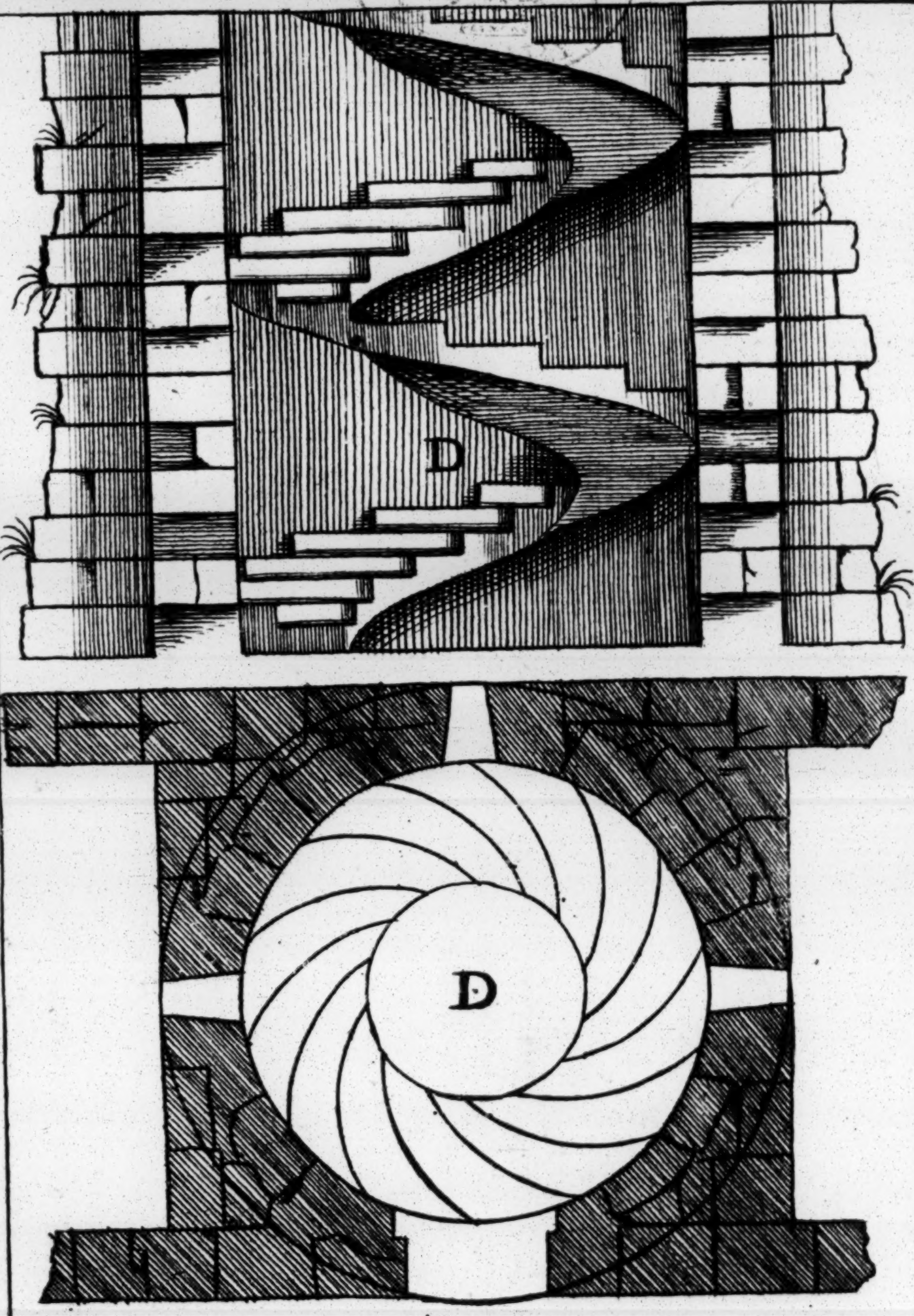
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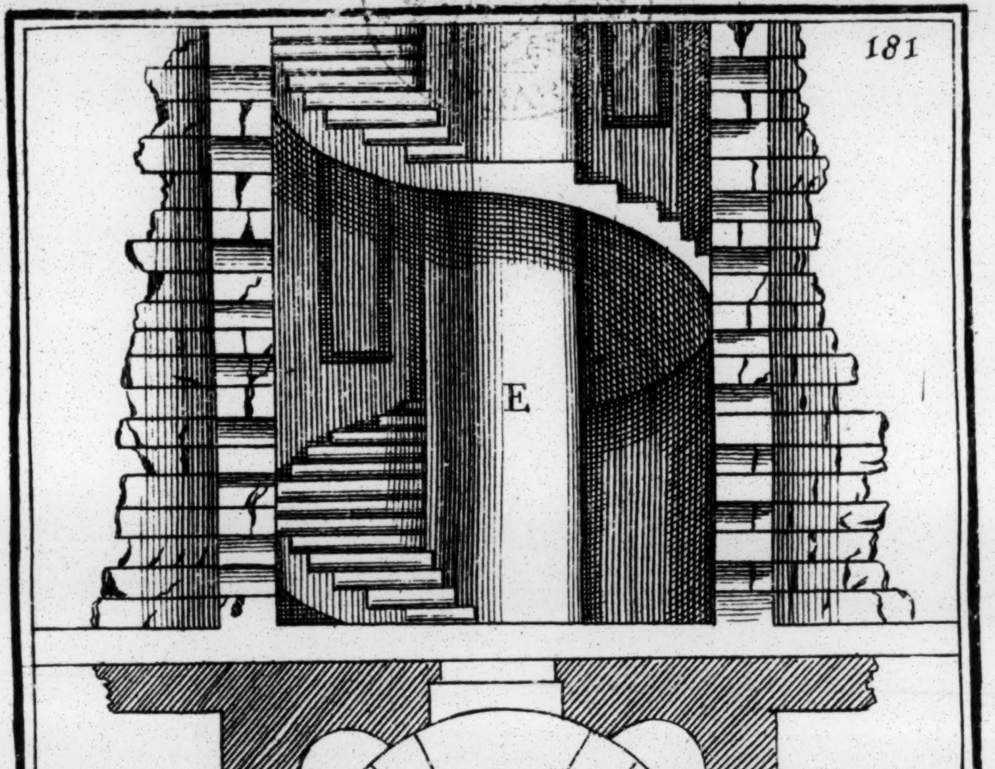
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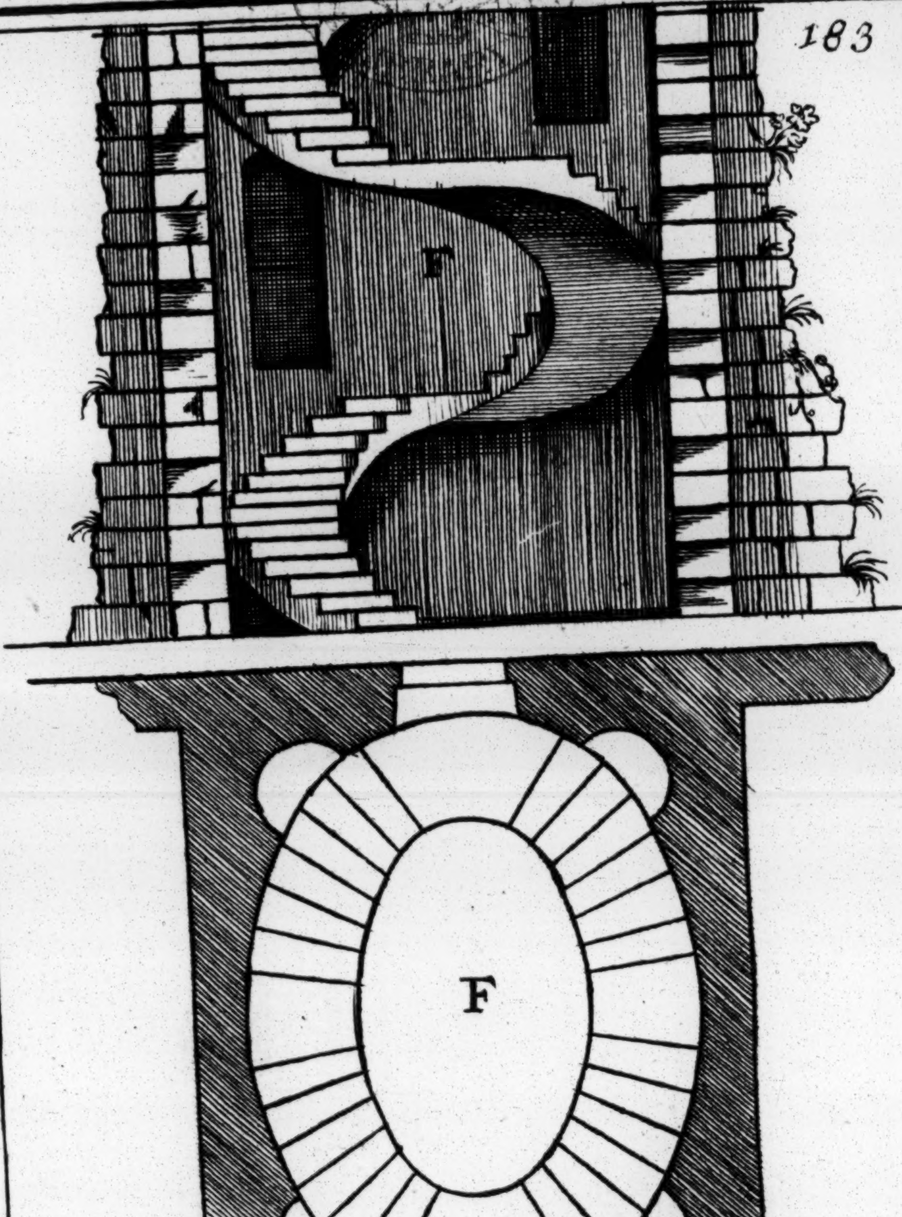
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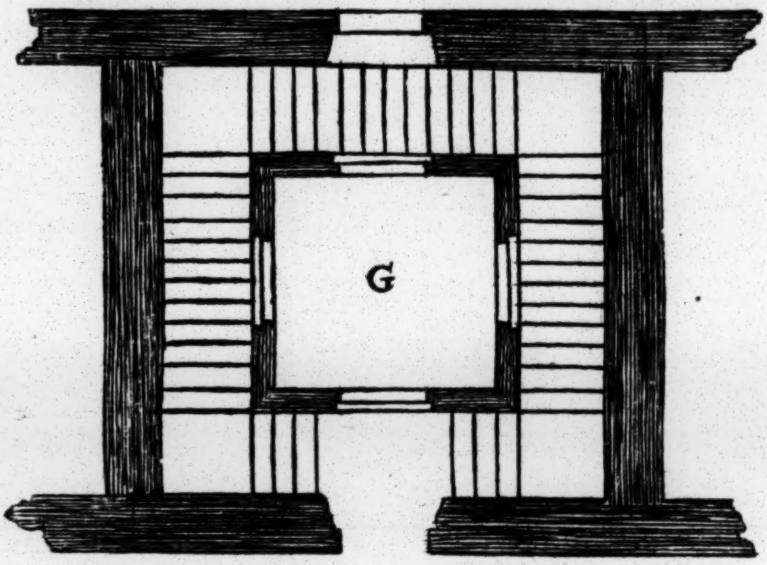
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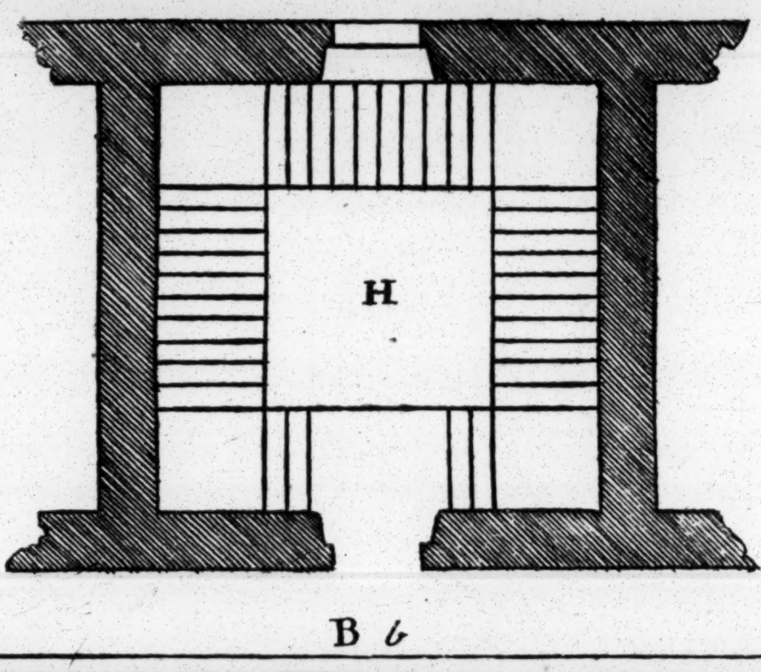
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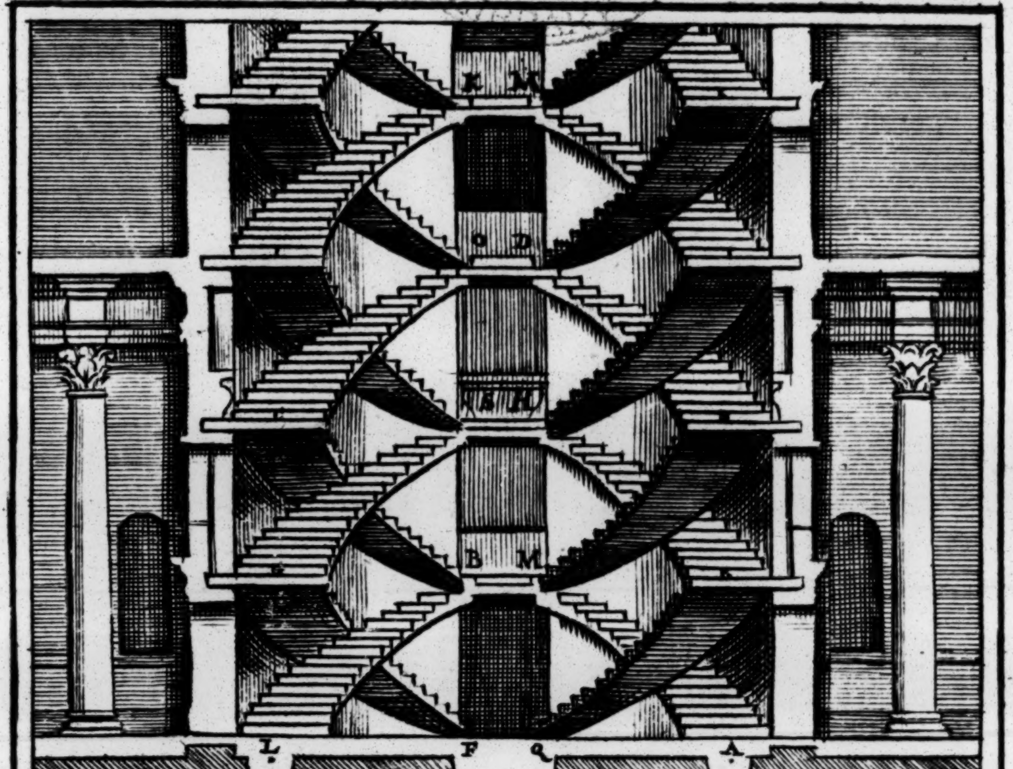

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OF
ROOFS.

RULES
AND
INSTRUCTIONS
FOR

Framing all Manner of ROOFS, whether Square or Bevel, either Above Pitch, or Under Pitch, according to the beſt Manner practiſed in *England*.

Alſo to find the Length of the Hips and Sleepers, with the Back or Hip-mould; never yet Publiſhed by any Architect, Modern or Antique; a Curioſity worth the Regard ev'n of the moſt Curious Work-men: Exactly demonſtrated in the following Rules and Deſigns, by that Ingenious Architect Mr. *William Pope* of *London*.

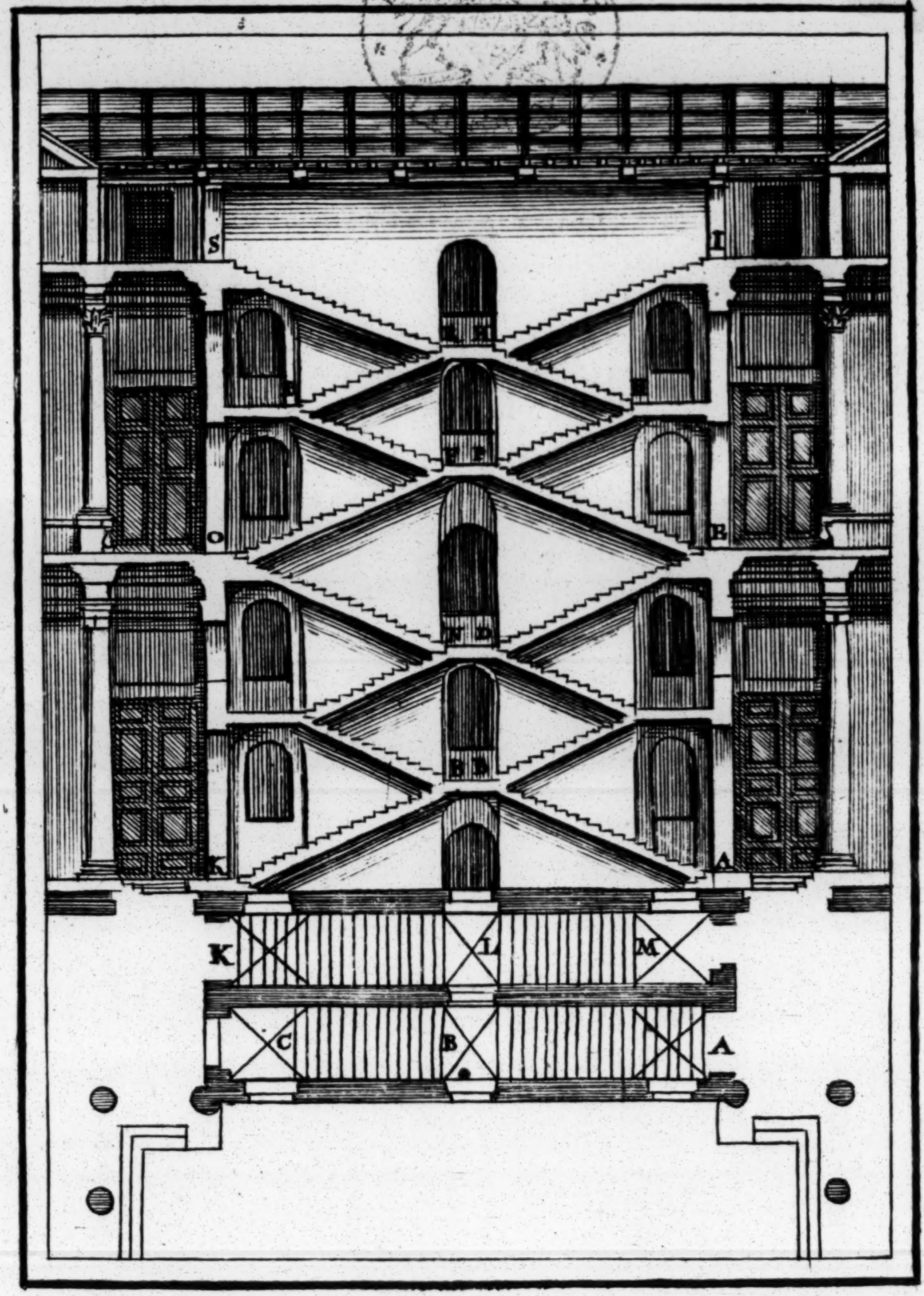
CHAP. XLVI. *Of* ROOFS.

HAving raiſed the Walls to their deſigned Height, and made the Vaults, laid the Joiſts, brought up the Stairs, and performed all thoſe things ſpoken of before; we are now to raiſe the Roof, which embracing every part of the Building, and with its Weight equally preſſing upon the Walls, is as a Band to all the Work; and beſides, defends the Inhabitants from Rain, from Snow, from the burning Sun, and from the Moiſture of the Night; adds no ſmall help to the Building, caſting off from the Walls the Rain-water, which altho' for a while ſeems to do but little Hurt, yet, in proceſs of Time, is cauſe of much Damage. The firſt Men (as ſaith *Vitruvius*) built their Houſes with Flat Roofs; but finding that thereby they were not defended from the Weather, they (conſtrained by Neceſſity) began to make them Ridg'd, that is to ſay) Raiſed in the Middle: Theſe Roofs are to be raiſed to a higher or lower Pitch, according to the Country in which they are; wherefore, in *Germany*, by reaſon of the great quantity of Snow that falls there, they raiſe their Roofs to a very great Pitch, and cover them with Shingles, which are ſmall pieces of Wood, or of thin Slate or Tiles; for if they ſhould raiſe them otherwiſe, they would be ruin'd, by reaſon of the Weight of the Snow. But we who dwell in a more temperate Country, ought to chuſe ſuch a Pitch which may ſecure the Building, and be of a handſome Form; therefore we divide the Breadth of the Roof into four equal Parts, and take three, which makes the moſt agreeable Pitch for our Country, and is the Foundation for the Raiſing of any manner of Roof, whether Square or Bevel, (as appears in the following Deſigns and Deſcriptions.)

The manner of Framing a Floor, *with the Names of each Member.*

1. *The Thickneſs of the Wall, and Lintel or Wall-plate; and if it be in Timber-work, then a Breſſummer.*
2. *The Summer.*
3. *Girders framed into the Summer.*
4. *Spaces between the Joiſts.*
5. *Joiſts.*
6. *Trimmers for the Chimney-way.*
7. *Trimmers for the Stair-Caſe, or Well-hole for the Stairs.*

CHAP.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CHAP. XLVII.

Of the Deſign A.

A A
A B

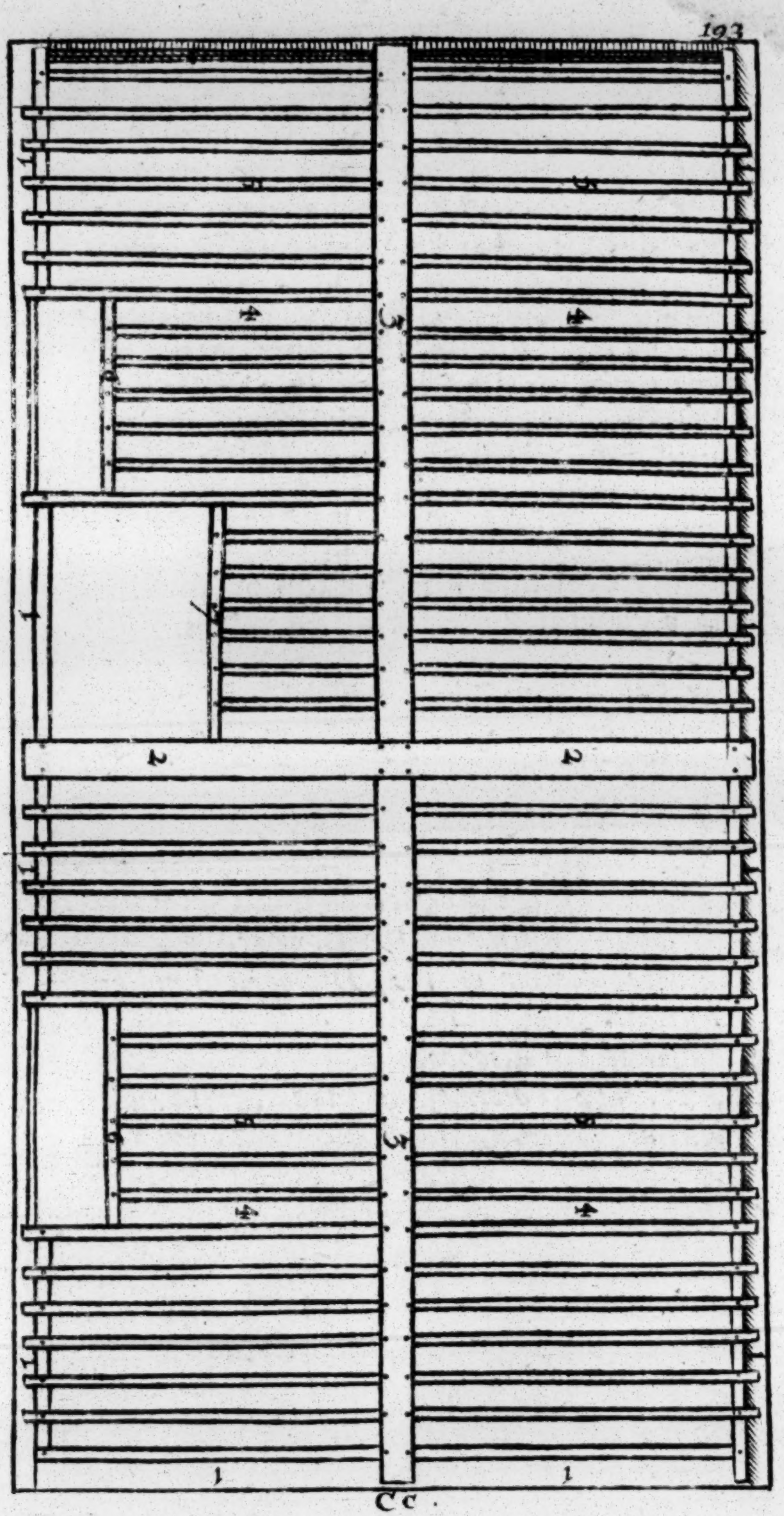
THE Breadth of the Houſe, *Cantilivers*, *Cornices*, and *Eaves*; the Length of the Raftings and Furrings, which ought to be ¼ of the Breadth of the Houſe A A.

The principal Rafters to be cut with a *Knee*, (as in the Deſign) that they may the better ſupport themſelves, and the Burthen over them, upon the Upright of the Wall, and alſo ſecure that part from the dripping in of the Rain; which otherwiſe would happen, if the Rafters were made Strait and Furred.

The Beam to the Roof, or Girder to the Garret-Floor, ought to Project without the Work as far as the Furring or Shreading, which is the *Projecture* of the *Cornice*.

This Manner of Framing the Roof will be uſeful from 20 to 30 Foot, or thereabouts.

1. *Ground-plate.*
2. *Girder, or Binding Interduce, or Breſſummer.*
3. *Beam to the Roof, or Girder to the Garret-Floor.*
4. *Principal Poſt, and Upright Brick-Wall.*
5. *Braces.*
6. *Quarters.*
7. *Interduces.*
8. *Prick-poſt, or Window-poſt.*
9. *Jaums or Door-poſt.*
10. *King piece, or Joggle-piece.*
11. *Strutts.*
12. *Collar-beam, Strutt-beam, Wind-beam, or Top-beam.*
13. *Door-band.*
14. *Principal Rafters.*
15. *Furrings, or Shreadings.*
16. *Ends of the Lintels, and Pieces.*
17. *Bedding-moulding of the Cornice over the Windows, and Space between.*
18. *Knees of the Principal Rafters, which are to be of one Piece.*
19. *Purline Mortices.*



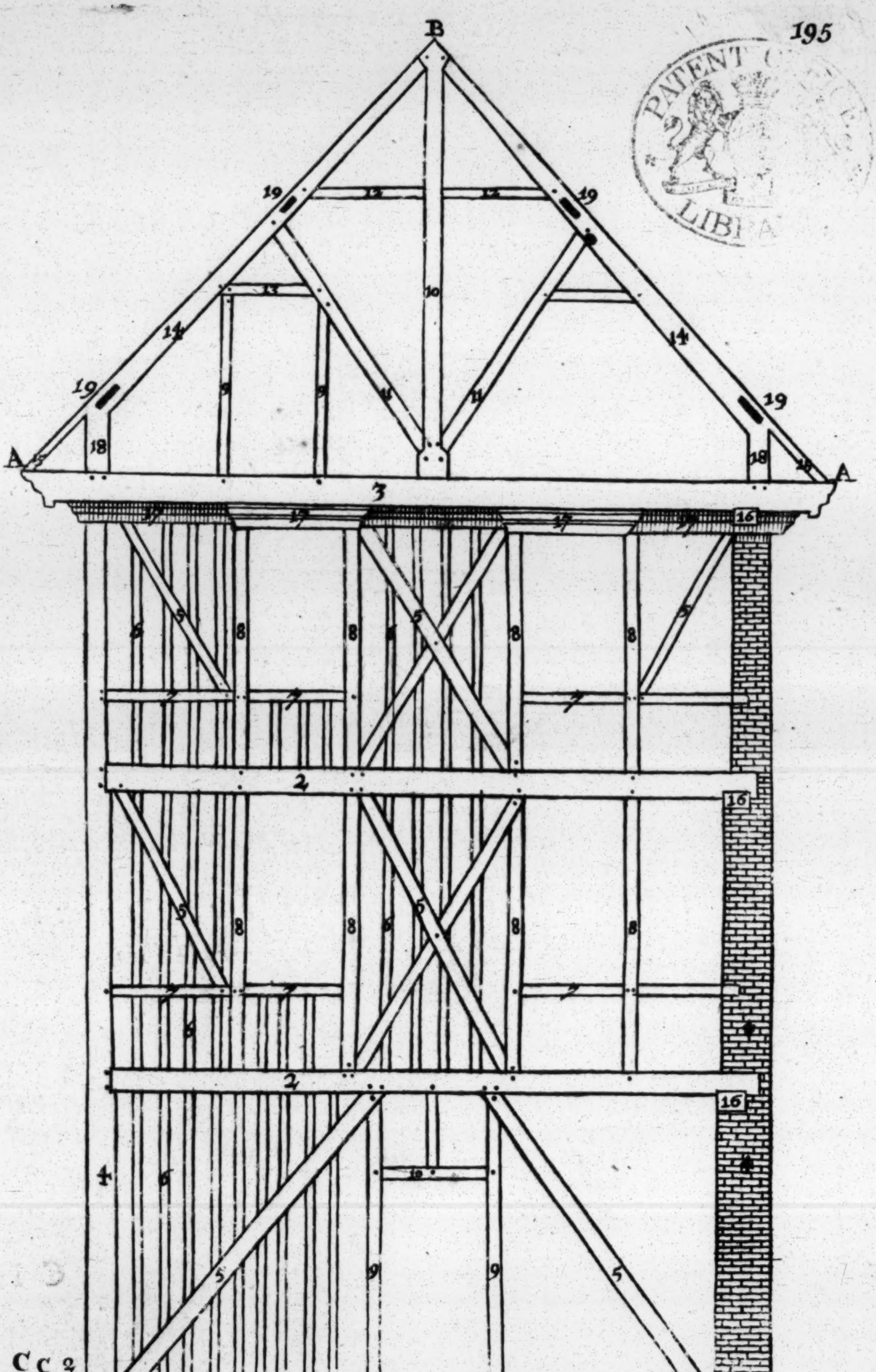
CHAP. XLVIII.

Deſign of the Gabel-End *or* Roof B.

LET the whole Breadth of the *Gable-End* or *Roof* A A be 20 Foot, divide the ſame into four equal Parts, take thereof three for the Length of the Principal Rafter A B, and placing that perpendicular from the Point C to the Point D, begets the Length of the *Sleeper* A D, which will be 18 Foot. And the Length of the *Dormers* Principal Rafter from A to E, when laid to its Pitch upon the back of the Principals, will reach to Level-line F B, or top of the Principal Rafter; and this is a general Rule for all Breadths.

1. *Summer or Beam.*
2. *King-piece, Crown-poſt, or Joggle-piece.*
3. *Braces or Strutts.*
4. *Principal Rafters.*
5. *The Sleeper.*
6. *Purline of the Dormer.*
7. *Principal Rafter of the Dormer.*
8. *Single Rafter of the Dormer, ſtanding on the Sleeper and Purline.*
9. *Point of the Sleeper.*

10, 11. *The Thickneſs of the Wall and Lintels, or Wall-plates.*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CHAP. XLIX.

Of the Italian *or* Hip-Roof C.

A A THE Breadth of the Roof, being 20 Foot:

A B The Length of the *Sleepers* or *Hips*, being 18 Foot, which is proportionable to the Houſe.

E D The Height of the Roof perpendicular.

C D The Length of the *Hip*, and the Angle which it maketh upon the *Diagonal*-Line, which is ſhewn by the Prick'd-line G, from F to C.

1, 2. *The Wall and Lintels.*

3. *Dragon-beam for the Hip to ſtand on.*

4. *Beam or Summer, wherein the Dragon-beams are framed.*

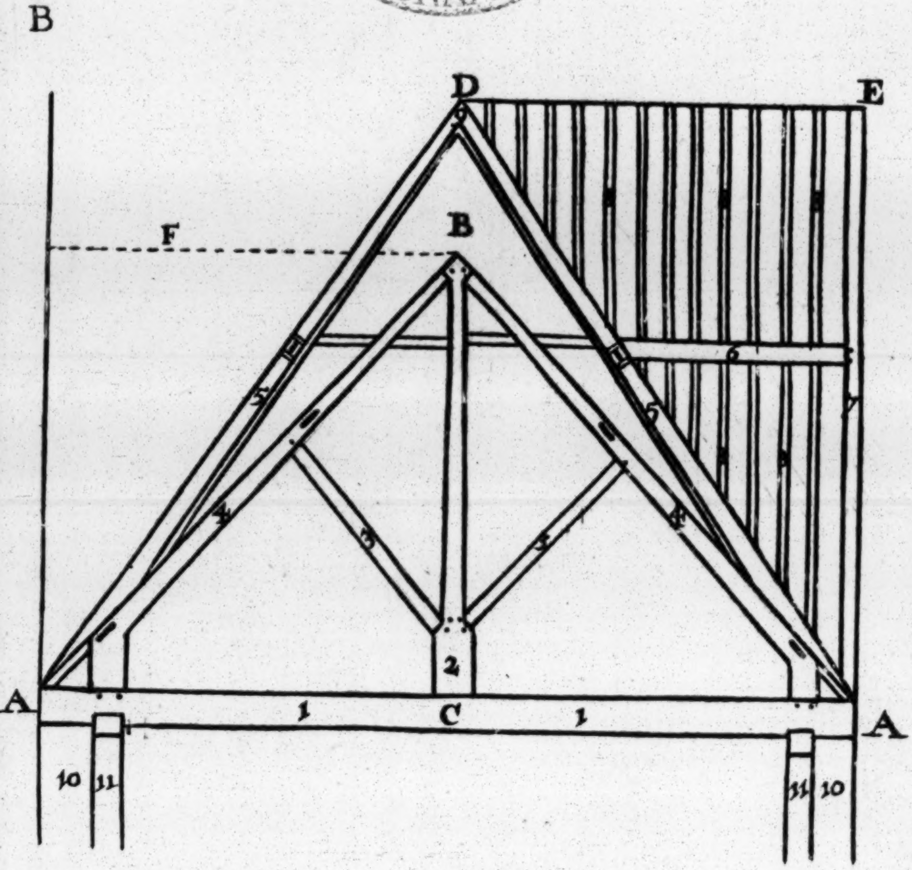
5. *King-piece or Crown-poſt.*

6. *Strutts or Braces from the Crown-poſts to the Hip-rafter.*

7. *Hips, as they make the Angle equal to the Breadth of the Houſe.*

8. *Hips, as they make the Angle in the Diagonal Lines from Corner to Corner.*

9. *The Additional Length which the Hips make upon the Diagonal-Line, more than the Breadth of the Houſe.*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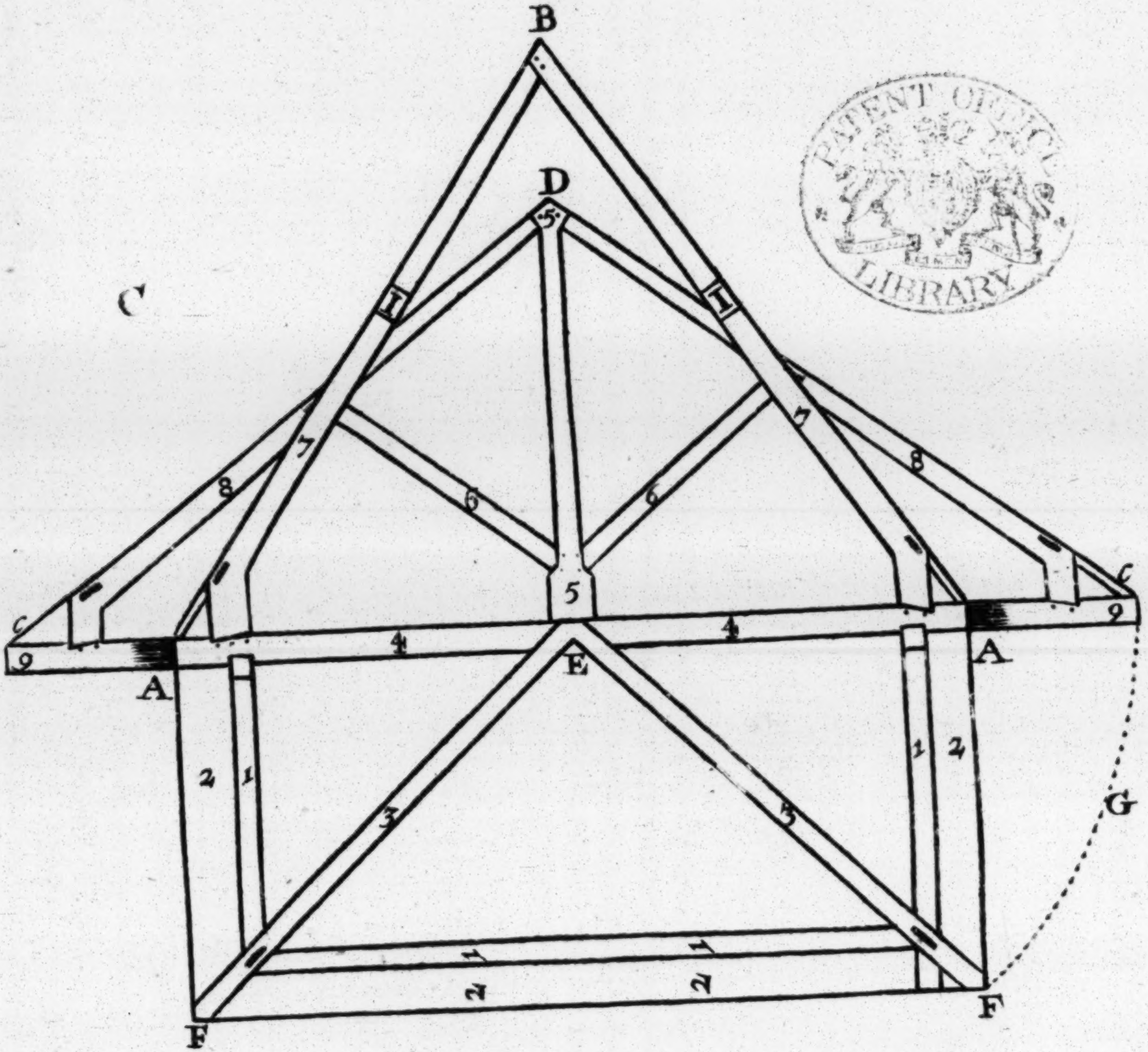

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CHAP. L.

Of Flat Roofs D.

WIthin a *Chamber-beam* and *Rafters* joggled in, whoſe Weight lieth not chiefly in the Middle, and may be ſo made that without hanging upon the Beam, the Principals may diſcharge the Weight; and how Drips may be made to walk on.

1. *Chamber-beam.*
2. *Principals joggled into the Chamber-beam.*

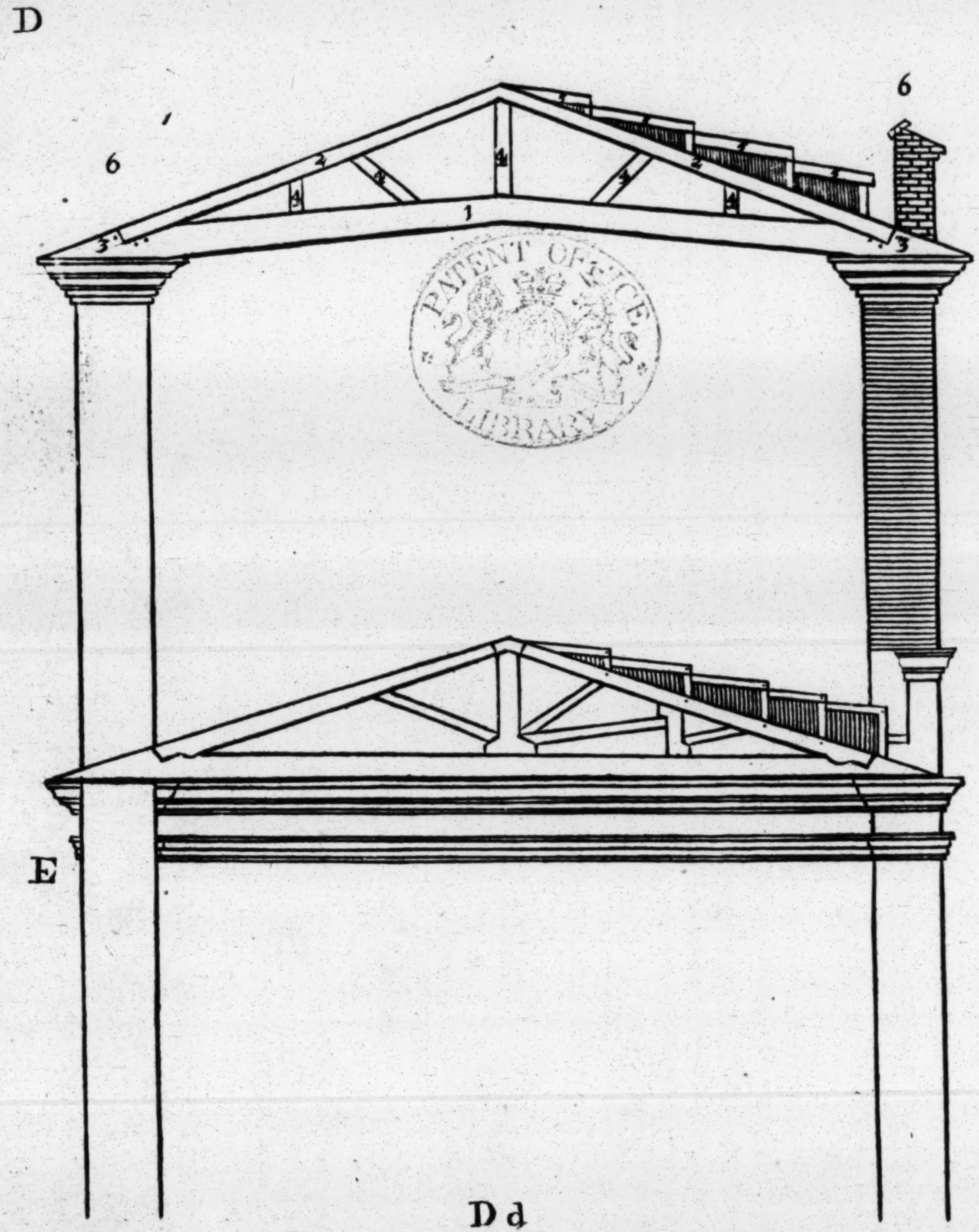
3. *The Place where the Principals are joggled in.*

4. *Puncheons or Braces.*

5. *Drips to walk on, and may be made with the leſs Current, that the Roof may be made the more Pitch, for the ſtrengthening thereof: And may be made higher or lower, according to the Building, and Diſcretion of the Architect.*

6. *Battlements.*

☞ *A Draught of a* Flat-Roof, *with a* Crown-Poſt, *or* King-Fiece.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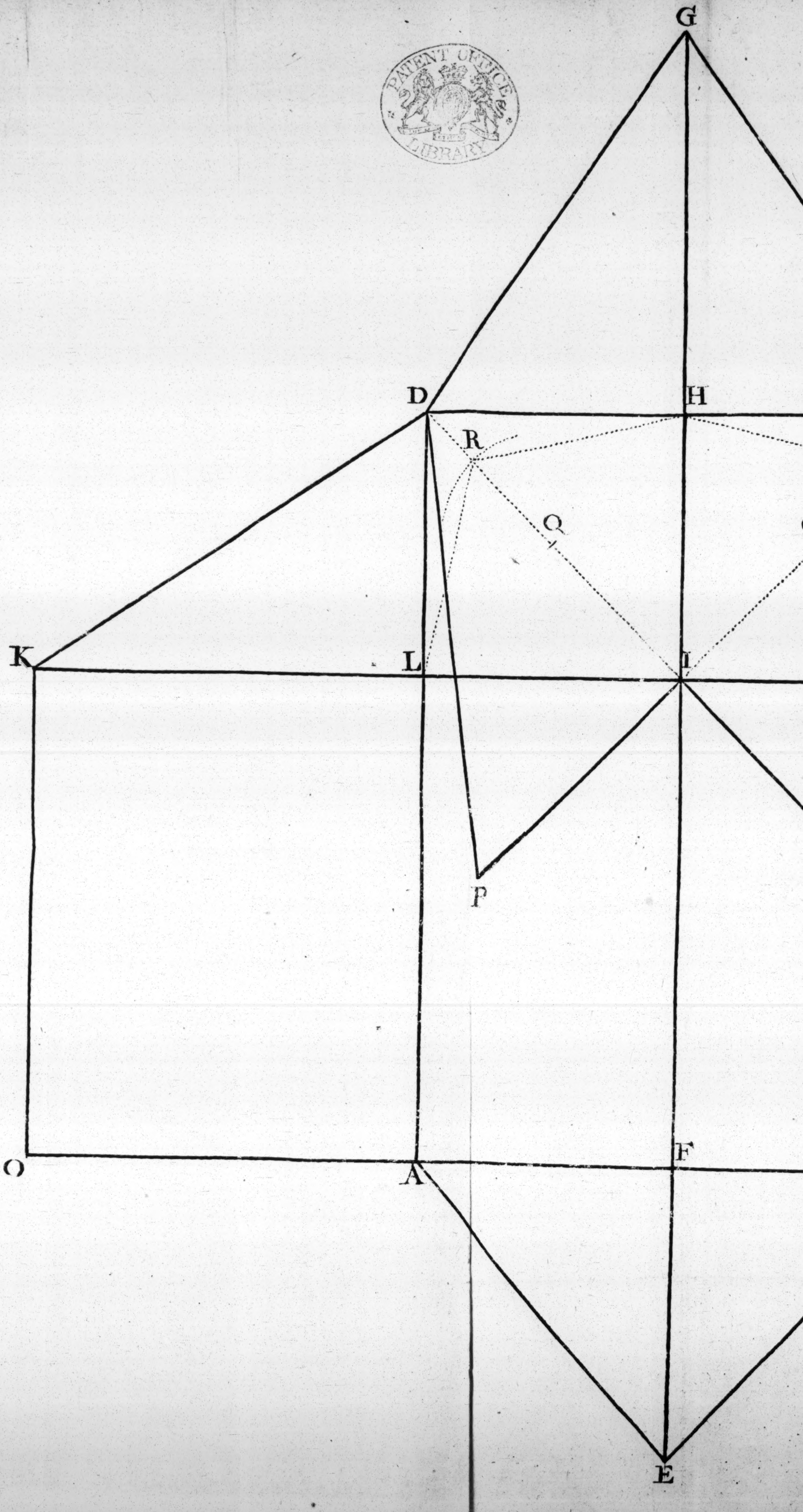
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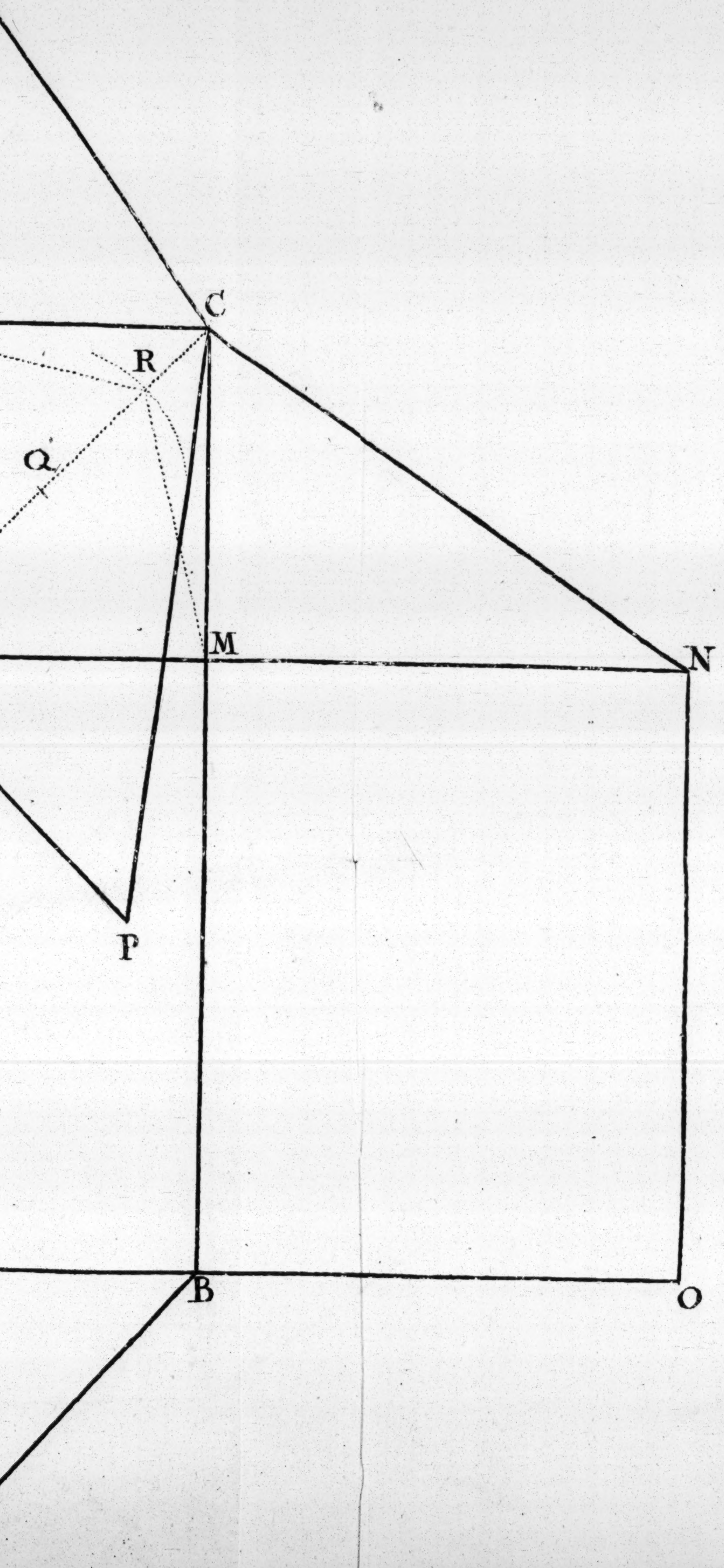
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CHAP. LI.

Of the Hip-RoofE.

INſtructions to find the Length and Back of the *Hip*, ſo as it may anſwer the Side and the End of the Perpendicular-line of the *Gabel-End*, the two Skirts, the Side of the Roof in *Plano*, or lying in Ledgment with the *Hip* and *Gabel-End*; the Diagonal and Perpendicular-lines being laid down proportional to any Breadth or Lengrh, by which the moſt Ingenious may ſerve himſelf; and an ordinary Capacity (already acquainted with the Uſe of the Ruler and Compaſs) may plainly demonſtrate all the Parts of a Roof, whether *Square* or *Bevel*, *Above Pitch*, or *Under Pitch*, by Lines of Proportion, (as may appear in the Deſign following)

Suppoſe the Roof 20 *Foot Broad, and in Length* 30, 40, *or* 50 *Foot, more or leſs.*

LET ABCD be the Sides and Ends of the ſaid Roof, one End to be *Hipt*, the other a *Gable-End*; draw the Lines ABCD the Breadth and Length of that Roof; then draw the *Gable-End* ABE, whoſe Sides or Principal Rafters being ¾ of the Breadth of the Houſe; then draw the Perpendicular Line E F, the Height of the *Gable-End*, which Line is of general Uſe to level the Ridge of all Roofs; and if the other End be *Hipt*, as in the Deſign DCG, then it ſerves to find the Length of the *Hip*, and the Back of the *Hip*, ſo that it may anſwer both Sides and Ends of the Roof, always obſerving that the middle of the Breadth of the Houſe is as I H; then draw the Line KLN through the Center I, which will make Right Angles to the Line EFHG both in *Bevel* and *Square* Houſes; then extend the Line AB on both Sides to O, being the Length of AE or EB the Length of the Principal Rafters, or ¾ of the Breadth of the Houſe; ſo will ON and OK make the Length of the Ridge I F, and K D and C N the two Skirts.

To find the Length of the Hip.

DRaw the Diagonal-line D I and I C, over which the *Hip* is to hang when in its due Place; then take the Perpendicular-line E F, and place it ſrom the Point I to P P perpendicular to the Diagonal or Baſe Lines D I and I C at I; ſo is I P and I P the Pitch of the *Hip* equal to the *Gabel-End* E F, and when erected, will hang perpendicular to the Point I; then take PD the Hypothenuſe of the Triangle D I P, and C P the Hypothenuſe of the Triangle CIP, placing them from D to G, and C to G, gives the Length of the *Hip* DGC; and when laid to their *Pitch*, will all meet perpendicular to the Point I.

To find the Back of the Hip, ſo that it may anſwer both Sides and Ends of the Roof, whether Square or Bevel.

LAY the Ruler from the Point L to the Point H, and from the Point H to M, and mark where it cuts the Diagonal Lines D I and IC at Q Q; then ſet one Foot of the Compaſſes on the Point Q, and extend the other Foot to the *Hip* Lines D P and C P at the neareſt Diſtance, with that mark the Point R upon the ſame Diagonal Lines; then draw the prick'd-Lines LRH and HRM, which make the Back of the *Hip* for the two Corners of that Roof.

This Rule ſerves for all Roofs, whether Over *or* Under Pitch.

CHAP. LII.

Of the Roof *Bevel at one End, and Square at the other; the* Gable-End *Square, the* Bevel-End *Hip.*

SUppoſe the Breadth of the Roof 20 Foot, the Length more on one Side than on the other, as in the Deſign ABCD; then draw the *Gable-End* AEB, whoſe Sides from A to E and from E to B is ¾ of the Breadth of the Houſe, or is the Length of the Principal Rafters; then draw the Perpendicular E F, the Height of the Roof from the Floor; and if Knee'd, then from the top of the Knee, (as in the Deſign of a Knee'd Rafter beforegoing.)

The Sides of the Roof which make the Ridge GHIK, to be drawn as is deſcrib'd in the foregoing Deſign.

Divide

cular-line E F, and place it ſrom the Point I to P P perpendicular to the Diagonal or Baſe Lines D I and I C at I; ſo is I P and I P the Pitch of the *Hip* equal to the *Gabel-End* E F, and when erected, will hang perpendicular to the Point I; then take PD the Hypothenuſe of the Triangle D I P, and C P the Hypothenuſe of the Triangle CIP, placing them from D to G, and C to G, gives the Length of the *Hip* DGC; and when laid to their *Pitch*, will all meet perpendicular to the Point I.

To find the Back of the Hip, ſo that it may anſwer both Sides and Ends of the Roof, whether Square or Bevel.

LAY the Ruler from the Point L to the Point H, and from the Point H to M, and mark where it cuts the Diagonal Lines D I and IC at Q Q; then ſet one Foot of the Compaſſes on the Point Q, and extend the other Foot to the *Hip* Lines D P and C P at the neareſt Diſtance, with that mark the Point R upon the ſame Diagonal Lines; then draw the prick'd-Lines LRH and HRM, which make the Back of the *Hip* for the two Corners of that Roof.

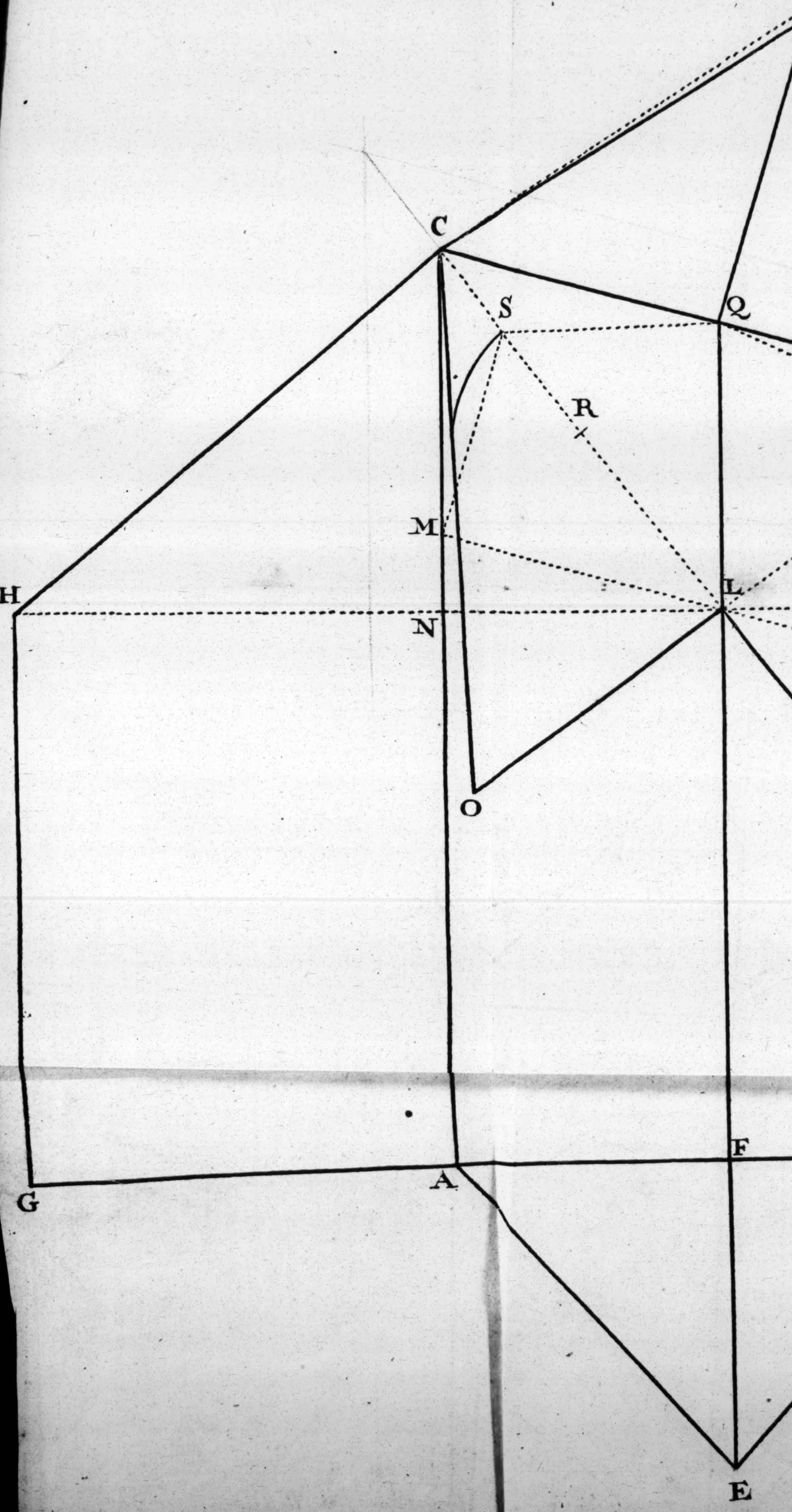
This Rule ſerves for all Roofs, whether Over *or* Under Pitch.

CHAP. LII.

Of the Roof *Bevel at one End, and Square at the other; the* Gable-End *Square, the* Bevel-End *Hip.*

SUppoſe the Breadth of the Roof 20 Foot, the Length more on one Side than on the other, as in the Deſign ABCD; then draw the *Gable-End* AEB, whoſe Sides from A to E and from E to B is $\frac{3}{4}$ of the Breadth of the Houſe, or is the Length of the Principal Rafters; then draw the Perpendicular E F, the Height of the Roof from the Floor; and if Knee'd, then from the top of the Knee, (as in the Deſign of a Knee'd Rafter beforegoing.)

The Sides of the Roof which make the Ridge GHIK, to be drawn as is deſcrib'd in the foregoing Deſign.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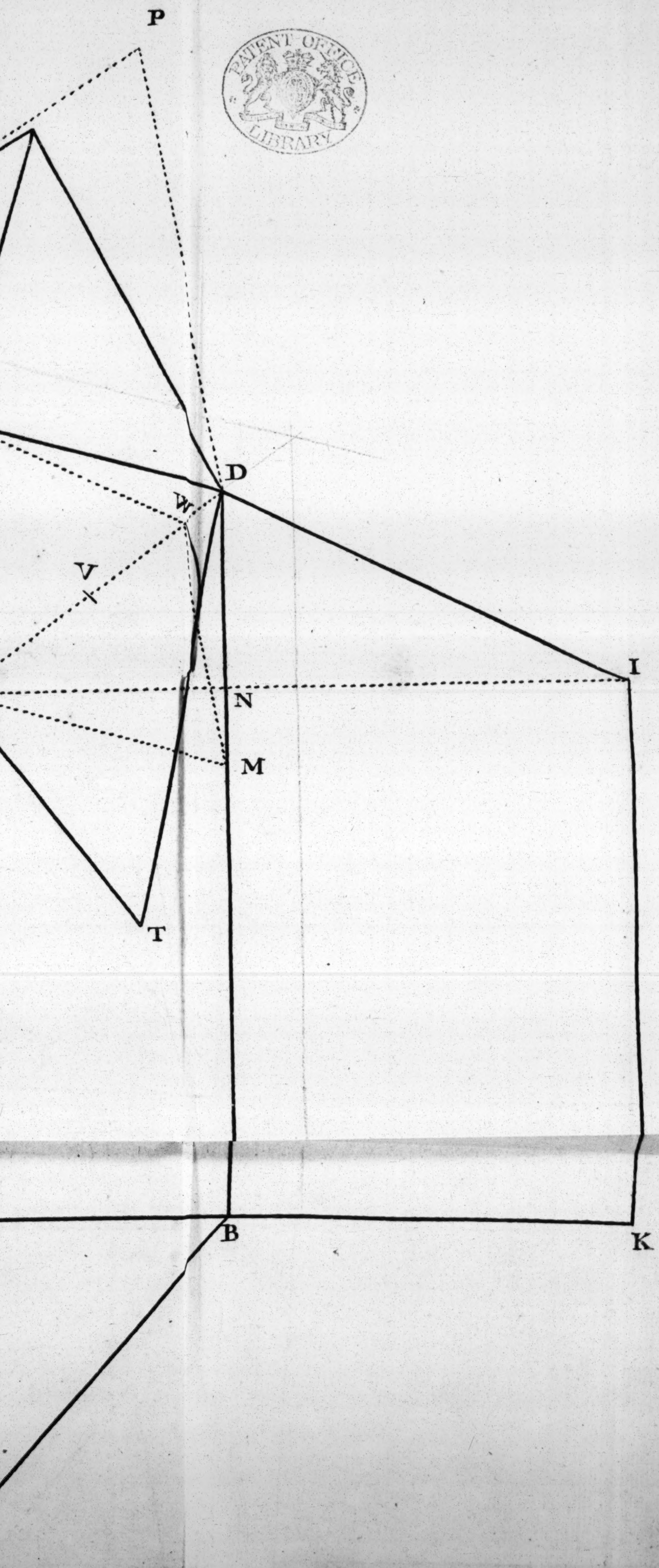

Divide the Breadth of the Roof into two equal Parts, as FLQ, then take the Diſtance L N, which is the half Breadth of the Houſe, and make it parallel to C Q D, as M L M and L will be the Point whoſe Perpendiculars O T will meet the Principal Rafters and *Hips*.

To find the Length of each Hip diſtinct one from the other.
Of the longeſt Hips.

DRaw the Diagonal Line L C, and take the Height of the *Gabel-End* E F, and place it perpendicular to L C at O, ſo have you the Height of the Roof perpendicular from O L equal to E F, the *Gabel-End*; and the Line O C will be the Length of the *Hip* Rafter, which will be equal to C H the Skirt for that Side of the *Hip*, and C P the Side of that *Hip* End.

To find the Back of the longeſt Hip CO.

LAY the Ruler from the Point M to Q, and mark where it cuts the Diagonal-line at R; then ſet one Foot of the Compaſſes at the Point R, and extend the other Foot till it touch the Line C O at the neareſt Diſtance; then make it touch the Diagonal-line at S; then draw the Lines MSQ. which is the Back of the *Hip*, for that Corner of the Roof.

To find the ſhorteſt Hip.

DRaw the Diagonal-line of LD, and take EF the Perpendiclar of the *Gable-End* (as before,) and place it from L to T perpendicular to L D: Then draw the Line T D, which is the Length of the *Hip* for that Corner, and is equal to the Skirt D I, and the Side of that *Hip* D P, which when erected, will meet with the other Principals perpendicular to the Point L.

To find the Back of this Hip.

LAY the Ruler from the Point Q to the Point M, and mark where it cuts the Diagonal-line L D at V; extend the Compaſſes from the Point V to touch the Line T D at the neareſt Diſtance, and carry that Diſtance on the Diagonal-line to the Point W; then draw the prick'd Lines M W Q, which will make the Back of that *Hip* fit for that *Bevel* Corner.

And this Rule ſerves for all Bevel Roofs, *Under or Over Pitch.*

Divide the Breadth of the Roof into two equal Parts,as FLQ, then take the Diſtance L N, which is the half Breadth of the Houſe, and make it parallel to C Q D, as M L M and L will be the Point whoſe Perpendiculars O T will meet the Principal Rafters and *Hips*.

To find the Length of each Hip diſtinct one from the other.

Of the longeſt Hips.

DRaw the Diagonal Line L C, and take the Height of the *Gabel-End* E F, and place it perpendicular to L C at O, ſo have you the Height of the Roof perpendicular from O L equal to E F, the *Gabel-End*; and the Line O C will be the Length of the *Hip* Rafter, which will be equal to C H the Skirt for that Side of the *Hip*, and C P the Side of that *Hip* End.

To find the Back of the longeſt Hip C O.

LAY the Ruler from the Point M to Q, and mark where it cuts theDiagonal-line at R; then ſet one Foot of the Compaſſes at the Point R, and extend the other Foot tiil it touch the Line C O at the neareſt Diſtance; then make it touch the Diagonal-line at S; then draw the Lines MSQ. which is the Back of the *Hip*, for that Corner of the Roof.

To find the ſhorteſt Hip.

DRaw the Diagonal-line of LD, and take EF the Perpendiclar of the *Gable-End* (as before,) and place it from L to T perpendicular to L D: Then draw the Line T D, which is the Length of the *Hip* for that Corner, and is equal to the Skirt D I, and the Side of that *Hip* D P, which when erected, will meet with the other Principals perpendicular to the Point L.

To find the Back of this Hip.

LAY the Ruler from the Point Q to the Point M, and mark where it cuts the Diagonal-line L D at V; extend the Compaſſes from the Point V to touch the Line T D at the neareſt Diſtance, and carry that Diſtance on the Diagonal-line to the Point W; then draw the prick'd Lines M W Q, which will make the Back of that *Hip* fit for that *Bevel* Corner.

And this Rule ſerves for all Bevel Roofs, *Under or Over Pitch.*

CHAP. LIII. G.

Of a Roof *Bevel at both Ends, and Broader at one End than the other.*

ABC D	THE Length and Breadth of the Houſe.
EFG.	The Length of the Rafters or *Pitch* between the wideſt and narroweſt End, about the middle of the Houſe, to ſtand over the the prick'd Line T T, as the Foot F to ſtand on the one T, the Foot G to ſtand on the other T.
H H	The Point of the two *Hip-Ends*, when brought to their due Place, will be perpendicular to P P, and will meet the Sides ICLM over the Points P P.
OOOO.	The Points of the Perpendiculars and Length of the *Hips* from ABCD.
QQQQ.	The Backs of the *Hips* or *Hip*-Mould due to each Corner.
RRRR.	The Points to find out Q, the Points for each Backs.
SSSS.	The Lines repreſenting half the Breadth of the Houſe parallel to each End.
TT.	Repreſenting the Middle of the Houſe.

Notwithſtanding the *Bevel-Ends*, you may place your Beams for your Principal Rafters to ſtand on a Square, or ſo near a Square as may be, or between both, as from the Ends of the prick'd Lines IKLM, bringing the outſide of them ſtraight under P; which will be more handſome for the Houſe in the Inſide, altho' it *Bevels* Outward.

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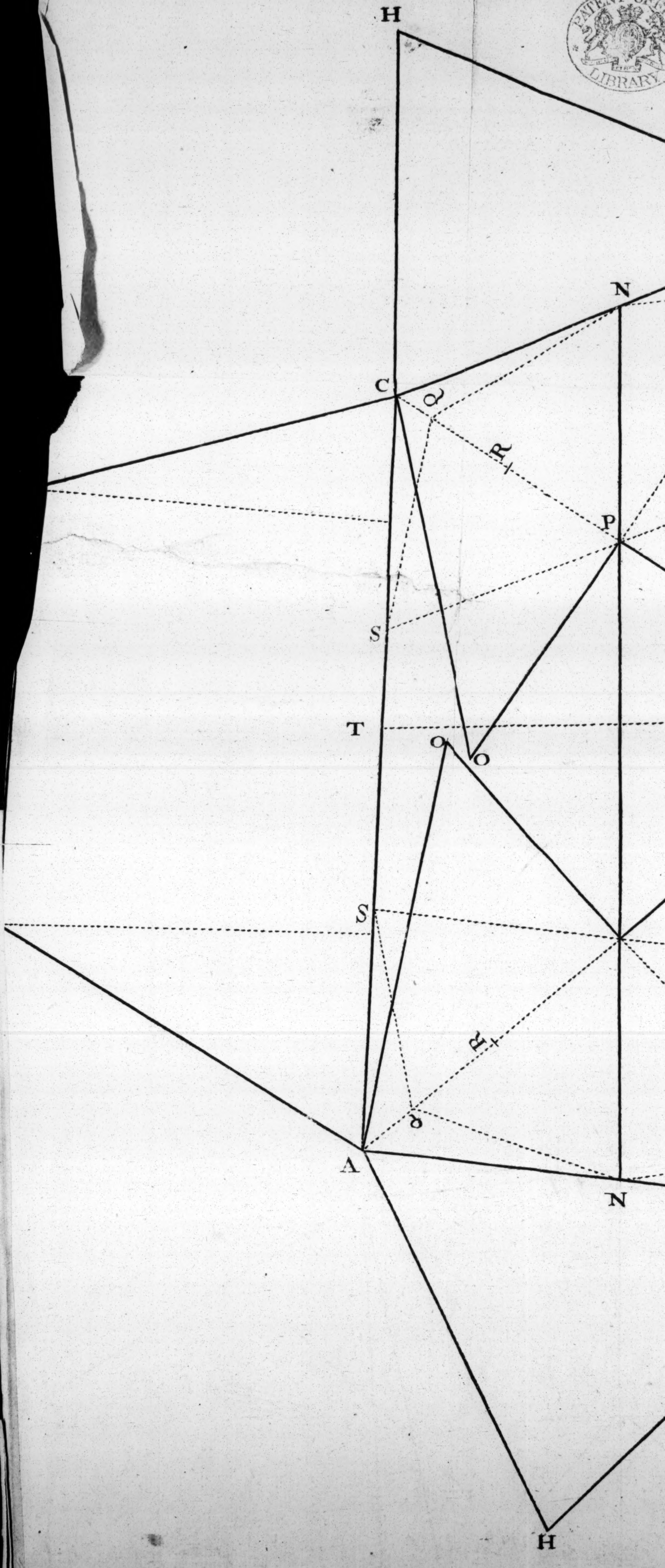

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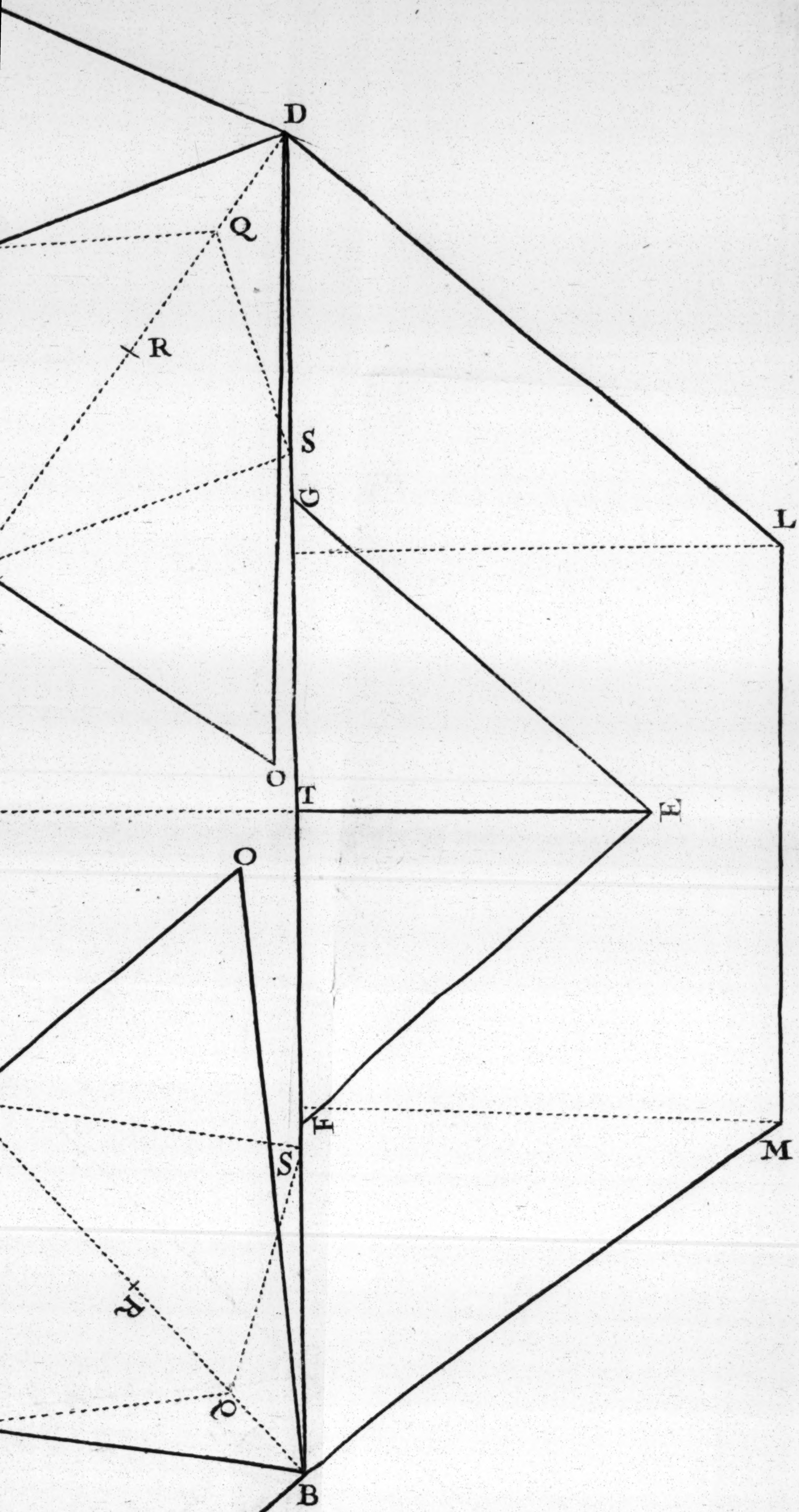

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